



Congratulations! You now own a Symtec Light Pen. This is the finest light pen available for the Apple Computer and meets professional quality and specification standards.

A System equipped with a light pen opens entire new vistas of application for computers. Applications are numerous and include graphics, games, scientific and technical uses as well as educational, exhibit and handicapped uses. Literally any function programmable on your computer, can be controlled by your light pen. Disk control, printer control, light pen music, and lo-res graphic data measurement, and more, are all achievable with a light pen. In fact, programs can be written to allow users to operate your computer without ever requiring the use of the keyboard.

The Symtec Light Pen is also designed to operate with video provided from non-computer sources such as videotape, videodisc, or closed circuit television and can control identification and measurement uses.

We hope that you will enjoy this powerful professional instrument and the new dimensions that it provides to your system.

Symtec, Inc.

## WHAT YOU WILL NEED

This manual was in the box. The box should also contain:

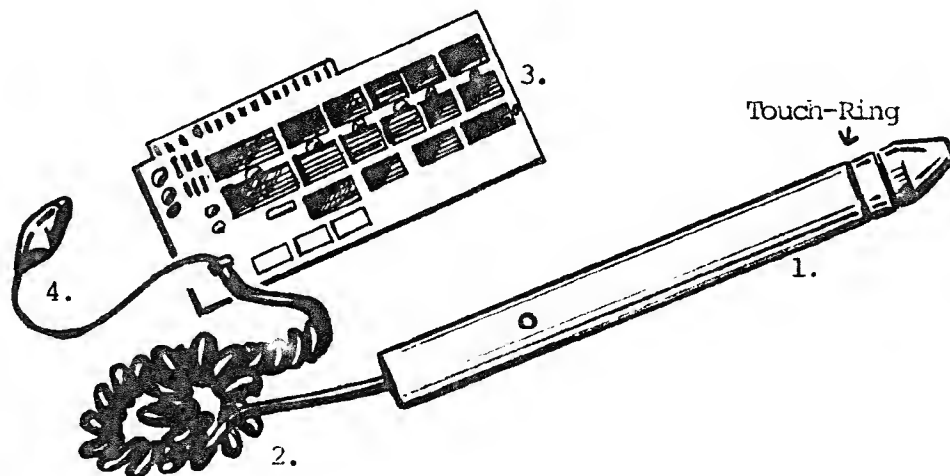
1. Light Pen barrel on a,
2. black telephone cord attached to,
3. the Apple interface card with a,
4. colored wire with a red, covered clip.
5. A 5 1/4" diskette.

On the barrel, just behind the nose of the pen, is the "touch-ring". (NOTE: A Push-Tip Light Pen is available, same price)

You, of course, must supply the Apple computer, and 1 or 2 disk drives. Our diskette is DOS 3.3 if your DOS is 3.2 please call or write us and we'll exchange it for you.

Your light pen can be used on a monitor or color TV. A color TV will require an "RF Modulator" with connecting cables, a monitor (color or B&W) can be hooked up directly with a cable that has a phono plug (male RCA connector) for the Apple and something to match the monitor at the other end. The light pen reacts best to B&W and color screens and can even be adjusted with most sets to respond to areas of the screen normally said to be "black". however, the Light Pen is designed to respond to light from the screen and this implies that a display is on the screen that provides something for the pen to "see". Some TV monitors with green screens do not permit enough light to pass through and the light pen cannot "see" anything on these sets.

If you already have your Apple computer set up you won't have to do much more.

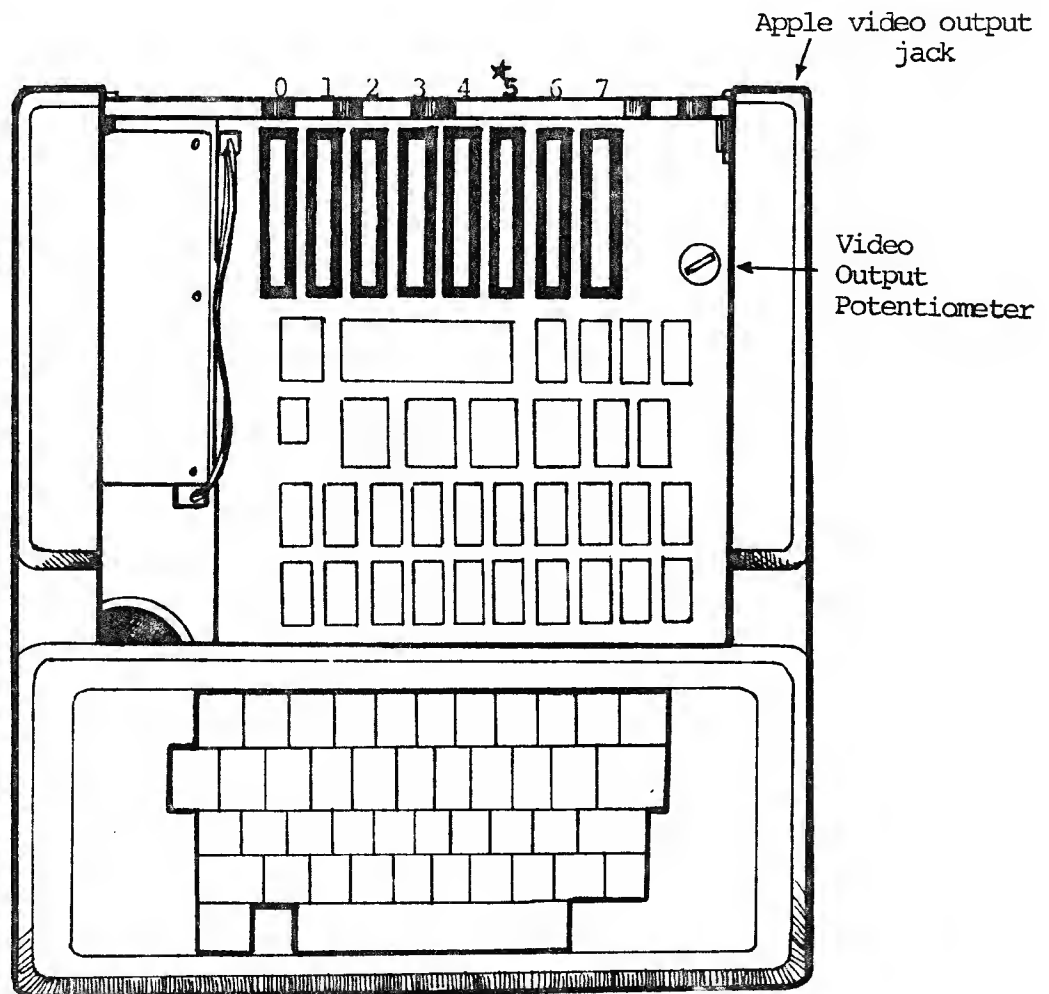


TO INSTALL THE SYMTEC LIGHT PEN IN YOUR COMPUTER PERFORM THE FOLLOWING:

1. Turn the Apple II OFF.
2. Open the lid of the Apple II case.
3. Install the interface card in slot #5\*  
(see Figure 1). NOTE: The slots are numbered at the back end of the motherboard. When installing the interface card, the components are to the right as you sit in front of the keyboard.
4. Clip the colored wire to the center post of the Apple VIDEO OUTPUT JACK. (Locate the video output jack and the video output potentiometer adjustment screw at the back right corner of the Apple.)
5. Turn the VIDEO OUTPUT POTENTIOMETER fully clockwise.
6. Run the light pen cord through the rear of the case.
7. Leave the lid off and turn the power ON.

You are now ready to align the Pen and register it to your own TV set.

\*To operate the light pen in a different slot, refer to page 17.



Put the light pen diskette in and "boot it" by turning the computer on or hit reset then type 6 control-p or pr#6

If the boot is good, on the screen will appear

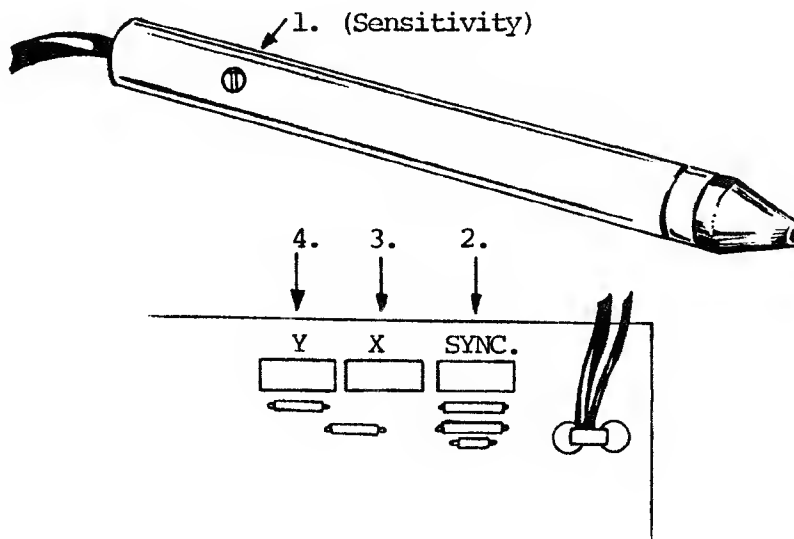
SYMTEC LIGHT PEN DISK  
VERSION 2  
APPLE DOS 3.3  
ALL PROGRAMS COPYRIGHT SYMTEC, INC.

1. LIGHT PEN OPERATED CATALOG
2. CATALOG
3. EXIT

PLEASE TYPE OPTION:

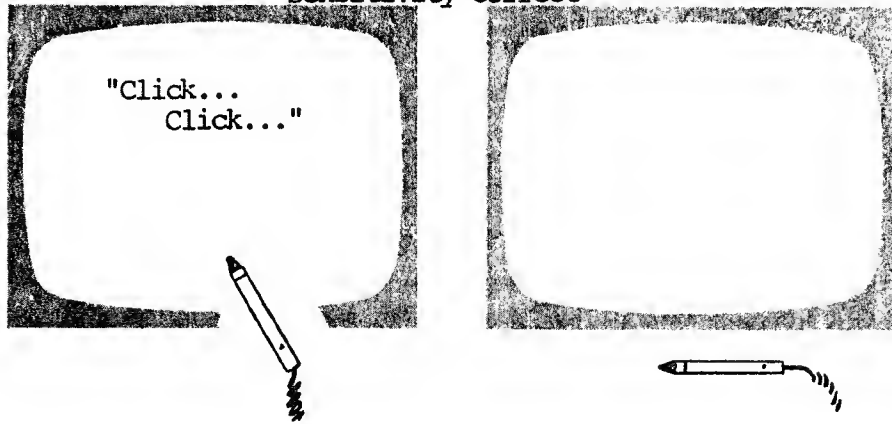
If not, you may have a D.O.S. 3.2 machine or a loose connection between your computer and disk drive. Try again or refer to page 15 of the Applesoft tutorial manual supplied with your Apple.

Now type "2" and hit RETURN. You'll get a catalog of files on the diskette. Type "run startup". There are 4 adjustments you may have to make, they are (1)Sensitivity, (2)Sync, (3)Horizontal alignment (X), (4)Vertical alignment (Y). See below.

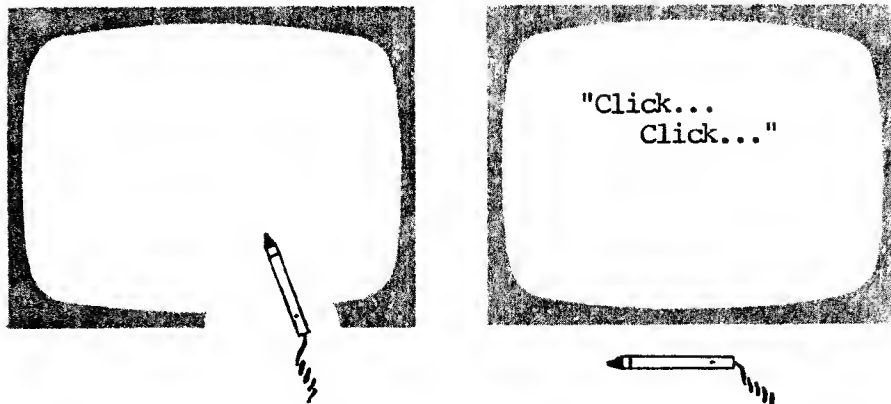


(1) Adjust the sensitivity as instructed on the screen. See below for reference.

Sensitivity Correct

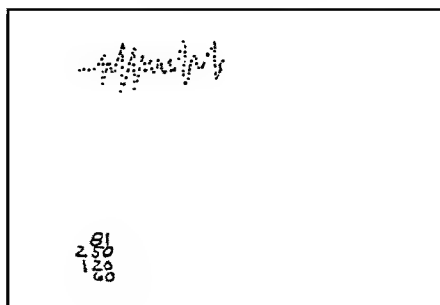


Sensitivity Incorrect

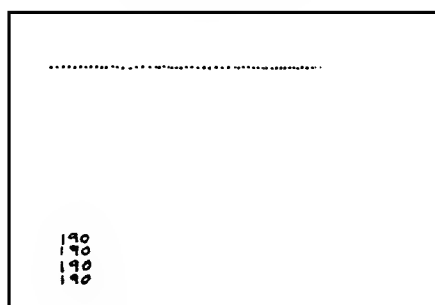


(2) To adjust the "sync", touch the ring and the screen should go black. If a straight line moves left to right and the same numbers appear at the bottom, your light pen is already in sync. If not, turn the sync pot until the numbers are appearing the same and the dots plot a straight line. Once completed, hit RESET, type RUN X Y CHECK, and do adjustments 3 and 4.

Incorrect Sync



Correct Sync



Note: The number 190 is used as an example. Your number may be different.

(3 and 4) This adjustment is for aligning your pen to the exact pixel. 4 dots will appear and their coordinates will be the same as below. To verify that your light pen sees only these dots, turn the brightness down until numbers flash only when you point at one of the 4 dots. Then turn your X and Y pots until the numbers below (the X coordinate is on the left) match. When you are finished hit RESET and type BRUN C to get to the light pen operated catalog.

(20,20)

(250,20)

(20,140)

(250,140)

Now that you have successfully set up your light pen, you are ready to program your light pen. But you need to learn the commands.

#### THE SEVEN COMMANDS OF THE SYMTEC HIGH RESOLUTION LIGHT PEN (Applesoft)

1. 29000 POKE -16176,0  
this starts the light pen receiving light from the TV screen and calculates the X and Y position of where the pen is being pointed. It stores the numbers in Apple memory.
2. 29010 IF PEEK(-16175)<128 then 29010  
this command stalls the program until the entire screen is scanned.
3. 29020 IF PEEK(-16170)<128 then 29020  
stalls the program until the ring is touched.
4. 29030 ZY = PEEK(-16173)  
this reveals the high resolution Y coordinate to the computer and stores it in variable ZY
5. 29040 ZX = PEEK(-16174)+256\*(PEEK(-16172)>127)  
this reveals the high resolution X coordinate to the computer, makes adjustments for X values over 255, and stores it in variable ZX
6. 29050 Y =INT(ZY/8)+1  
this resolves the Y high resolution coordinate into low resolution format.
7. 29060 X =INT(ZX/7)+1  
this does the same conversion to low-res for X as Y
8. 29100 Return



]LIST

```
10 REM MENU EXAMPLE
25 HOME
29 HTAB 20
30 VTAB 1: INVERSE : PRINT "1"
39 HTAB 20
40 VTAB 2: INVERSE : PRINT "2"
49 HTAB 20
50 VTAB 3: INVERSE : PRINT "3"
51 NORMAL
52 VTAB 15: PRINT "PLEASE POINT THE LIGHT PEN AT ONE OF THE NUMBERS"
60 GOSUB 29000
70 IF Y = 1 THEN GOSUB 1000
80 IF Y = 2 THEN GOSUB 2000
90 IF Y = 3 THEN GOSUB 3000
500 GOTO 25
1000 HOME : PRINT "SEGMENT 1 COULD BE A FILE OF A CUSTOMER"
1001 VTAB 10: PRINT "TOUCH RING TO RETURN TO MENU"
1010 FOR G = 1 TO 1000: NEXT G
1020 GOSUB 29000
1040 RETURN
2000 GOTO 2010
2010 HOME : FLASH : PRINT "NEW"
2011 NORMAL : PRINT "HOW MANY LETTERS IN THE ALPHABET?"
2020 VTAB 5: PRINT "29"
2030 VTAB 10: PRINT "26"
2035 VTAB 15: PRINT "23"
2040 GOSUB 29000
2050 AN = Y
2060 IF AN < 10 THEN PRINT "TOO HIGH, TRY AGAIN": GOTO 2011
2070 IF AN > 10 THEN PRINT "TOO LOW, TRY AGAIN": GOTO 2011
2080 IF AN = 10 THEN PRINT "RIGHT!" ": FOR D = 1 TO 500: NEXT
2100 RETURN
3000 HOME : VTAB 15: PRINT "YOU COULD PUT YOUR CHECKBOOK UNDER THIS SEGMENT"
3010 FOR M = 1 TO 1000: NEXT
3020 VTAB 10: FLASH : PRINT "TOUCH RING TO RETURN TO MENU"
3040 GOSUB 29000
3060 RETURN
29000 POKE - 16176,0
29010 IF PEEK ( - 16175) < 128 THEN 29010
29020 IF PEEK ( - 16170) < 128 THEN 29020
29030 ZY = PEEK ( - 16173)
29040 ZX = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127)
29050 Y = INT (ZY / 8) + 1
29060 X = INT (ZX / 7) + 1
29100 RETURN
```

Type the commands in first whenever you are writing a program to use the light pen and then put in "GOSUB 29000" whenever you want to use the light pen. We recommend the Applesoft Tutorial as a prerequisite for continuing.

You can make a flip chart type program that is activated by the light pen. Type in the 7 commands and the return statment first and then type this:

```
100 VTAB 12:PRINT "1981 was a good year"
110 GOSUB 29000
120 VTAB 14:PRINT "1980 was a great year"
130 GOSUB 29000
140 VTAB 16:PRINT "1982 will be better!"
150 GOSUB 29000
160 HOME:VTAB 12:PRINT"how's that for optimism?"
170 GOTO 100
```

You must touch the ring before the next print statement will be activated. Try it.

On the following page is an example of a light pen operated menu. Remember that the Apple prints text in the screen mode called 'LORES/TEXT' or resolution of 40 pixels across by 24 down. To make your light pen "see" 40 X 24 we use commands #6 and #7. This enables you to make the light pen coordinates of X and Y equal to VTABS and HTABS. Thus, you can VTAB 1:HTAB 20 and then print the number "1", and know that when the light pen is pointing at the number "1", its x and y coordinates in LORES/TEXT will match(Y will equal 1, X will equal 20). Now you can tell the computer to do a specific task if Y equals 1 and if Y is equal to something else, then do another specific task. Take a minute or two and try this program.

## SYMTEC LIGHT PEN SOFTWARE

### LIGHT PEN TABLET

#### WHAT YOU'LL NEED

- .Apple II (with applesoft card) or Apple II Plus, 48K
- .1 or 2 disk drives (Dos 3.3)
- .Color Monitor
- .Symtec High-Res Light Pen
- .Symtec L.P. Diskette

#### WHAT YOU'LL BE ABLE TO DO

Use the light pen to create colorful graphics or pictures. Designed to work similar to the Apple Graphics Tablet. You can draw in different colors on colored backgrounds. You can touch two dots on the screen and the computer will make a colored box or frame or line using the dots as corners or endpoints. You can touch two dots on the screen and the computer will draw the perimeter of a circle or a colored disk using the first dot as the center and the second dot as the edge of the circle. Or the pen will draw colored dots only! You can save your artwork on disk for future touch-ups or put the picture on another disk to use in a program.

#### HOW TO START

Hook up the Apple equipment according to the manual. Hook up the Symtec light pen according to the manual and calibrate it to the TV. Then put the Light Pen diskette into disk drive #1. "RUN TABLET"

The first menu you'll see will be the "main menu". Point to "pen mode", touch the ring, okay the choice and the "pen mode" menu will appear. Choose "BACKGROUND COLOR". (You must choose your background color before any other pen mode choice.) Eight colors will be displayed in columns (left to right-black1, magenta,..., etc.). Choose a color by pointing the pen to a color and touching the ring. When the color is chosen the computer will fill the screen with that color background and then display the "pen mode" menu. Choose "pen color", pick a color, then box or disk, etc. and off you go.

## MAIN MENU

CLEAR-clears screen

PEN MODE-takes you to "pen mode" menu

DISK COMMANDS-lets you "save" or "load" a picture. You must type the picture name in. Catalog allows you to see what's already on the disk.

DISTANCE-plot two points (by touching the ring) on your picture and the distance (in pixels) will be displayed.

QUIT-lets you go on to another program.

## PEN MODE

DRAW-draws in color-when the ring is touched it will draw. When you let go, it won't.

LINE-draws line from first dot to second dot. Dot is plotted when you touch the ring

DOTS-puts colored dots on the screen when ring is touched.

FRAME-uses first dot as upper left corner of frame and second dot as lower right corner. Draws rectangular frame.

BOX-same as frame only the entire inside is filled in color.

CIRCLE-same principle as frame only first dot is center, second dot outside edge of circle.

DISK-same as circle only inside is filled in color.

BACKGROUND COLOR-changes entire screen to one color, which you choose immediately after okaying background color.

PEN COLOR-changes pen color, same way as changing background color.

VIEW PICTURE-lets you view the drawing

MAIN-takes you to main menu

## COLOR ANOMALIES

### UNUSUAL COLOR EFFECTS

Unusual things happen with color combinations and the Symtec Tablet software program. These dashed lines, zebra stripes, and color shadows are a result of the Apple computer and not your light pen or software. The reason is that in the high resolution graphics mode, there are 280 X 192 or 53,760 pixels that require a "bit" of memory. Multiply that by 8 colors and the Apple would require several hundred thousand bits of information to properly handle an 8 color high resolution picture. A 48K Apple simply cannot handle all the colors.

The best way to avoid the "anomalies" is to use only black and white. The functions draw, frame, lines, and circle are most affected, while box, disk, and dots are least bothered by using colors. You can also get better results by using colors in the "1" group with "1"'s and "2"'s with 2's. The "1" group includes the four colors on the left and the "2"'s are the rest, each group has its own black and white.

MENU EXAMPLE is a partially completed menu. Study it and this page to understand the basic idea.

How you view the screen...

VTAB 1	
VTAB 18	X File

How your light pen views the screen...

Y=1	
Y=18	

Whatever you print after VTAB 1 will correspond equally with the "Y" value returned by the light pen. (You have 40 characters with which to print on that line). Thus when you VTAB 18:PRINT "X File" and then GOSUB 29000, the light pen will be pointing at "X File" when Y=18. Then just say "If Y=18 GOTO (X File)"

The following programs are on your diskette:

- \*A 024 LIGHT PEN TABLET
- \*B 006 PEN DRAW OBJ V2
- \*B 016 ZPEN DRAW.OBJ
- \*A 003 LIGHT PEN DRAW APLSFT
- \*I 003 LIGHT PEN DRAW INT BASIC
- \*A 003 HELLO
- \*I 003 APPLESOFT
- \*A 007 ZAPPLESOFT PEN ROUTINE
- \*I 026 CHECKERS
- \*B 037 HYDRAULICS TUTOR
- \*I 008 ZINTEGER PEN ROUTINE
- \*A 017 LIGHT PEN CONCENTRATION
- \*B 005 C
- \*B 002 ZMACHINE CODE PEN ROUTINE
- \*A 009 STARTUP
- \*A 004 X Y CHECK
- \*B 002 YCNT
- \*A 005 MENU EXAMPLE

MENUEXAMPLE, STARTUP, and X Y CHECK have already been explained. LIGHT PEN TABLET is explained on the following pages. Programs that have a Z in the front of their file names are machine code programs called by other programs on this diskette. YCNT and PEN DRAW OBJ V2 are binary files called by startup and LIGHT PEN TABLET. HELLO and APPLESOFT are catalog programs. The program C is the light pen operated catalog which will automatically add any new files that you save onto the disk.

LIGHT PEN DRAW has an integer, applesoft, and machine code version. First, choose a background color by typing a B or W (black or white) and then the pen will draw the opposite color. To erase the screen, point at the bottom line. To point at the screen and not draw, touch the ring. To save a drawing, hit RESET, then type BSAVE(picture name),A\$2000,L\$3FFF. To recall a saved picture on disk, type HGR2, hit RETURN and type BLOAD (picture name).

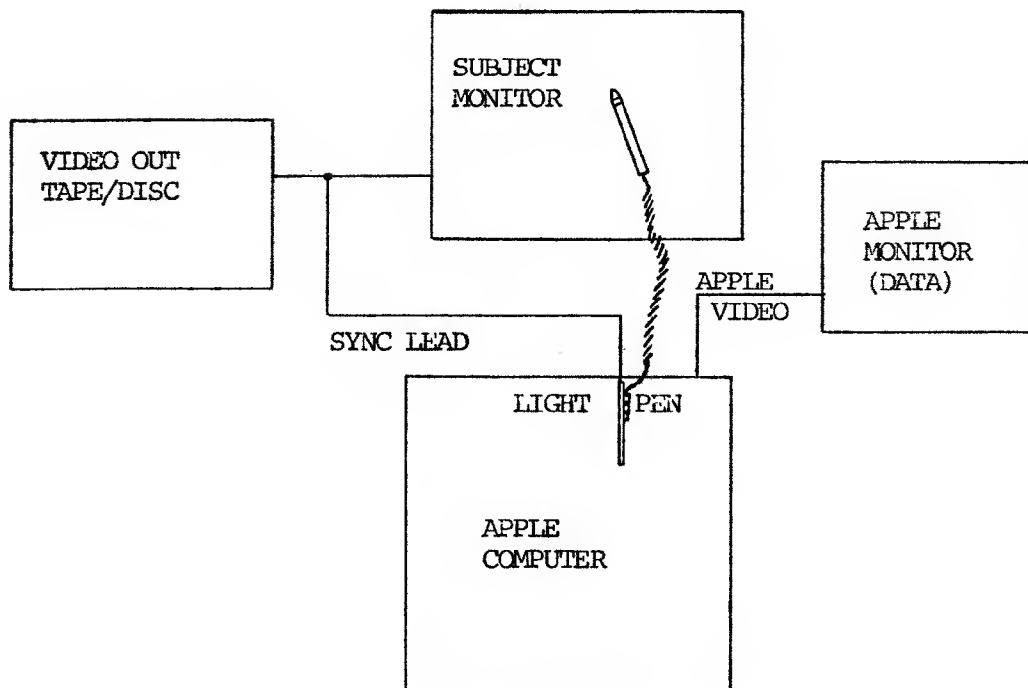
Try LIGHT PEN CONCENTRATION. The object is to match two squares and score a point. To uncover the contents of a square, point the light pen at it and touch the ring. The computer will keep score. You can have 2 players or try your luck against the computer.

CHECKERS requires your computer to have Integer language. First, choose the colors of your checkerboard and players. Point and touch the ring to move a player.

HYDRAULICS TUTOR has its instructions built into it and is an interactive training system. Students use the light pen to take readings and locate the malfunction in the system.

## HOW TO USE YOUR SYMTEC HIGH-RES LIGHT PEN WITH VIDEO FROM NON-COMPUTER SOURCES

The Symtec light pen for the Apple has an interesting feature. The pen can be used to measure, trace, etc., video images from a tape recorder, video-disc player, live camera, etc. You'll need another monitor and a source of video. The diagram below shows you how to hook up this system.



## THE SCREEN

The Apple Computer sends out signals to the CRT (cathode ray tube) or TV which then displays the message on the screen. The screen mode or picture is a collection of tiny dots or pixels which can be individually colored. The Apple picture does not use all the possible pixels that are available to it from the CRT. It uses a square in the middle that is 280 pixels across and 192 pixels down or most of the screen. When your light pen is pointing to the screen, it "sees" a grid of pixels (280 x 192) or 53,760 dots. It automatically puts the X and Y coordinate in memory. Since it is working with the Apple computer, it can only receive or work with the pixels that it is given or the 53,760 in the square. Sometimes, this accuracy is not necessary because you would be happy to be somewhat near a general area. There are ways to do this with software.

A popular screen mode is called low resolution with text (LORES/TEXT). A LORES/TEXT pixel is actually 4 HIRES pixels high and 7 HIRES pixels wide. To make your light pen "see" only LORES/TEXT pixels you have to tell it that pixels in an area 7 pixels across and 4 pixels deep (28 pixels in all) are the same point. Your light pen always sees individual pixels, so after you find out what the HIRES coordinates are, you have to mathematically convert HIRES to LORES/TEXT. The formulas are below. We mostly convert to the popular LORES/TEXT which is the screen mode your Apple prints text in.

### CONVERTING HIRES COORDINATES TO LORES /TEXT OR LORES

#### LORES/TEXT

$$\begin{aligned} X &= \text{INT}(ZX/7) + 1 \\ Y &= \text{INT}(ZY/8) + 1 \end{aligned}$$

#### LORES

$$\begin{aligned} X &= \text{INT}(ZX/7) \\ Y &= \text{INT}(ZY/4) \end{aligned}$$



## USING A DIFFERENT SLOT

Moving the Symtec Light pen card to a different slot requires that you change the card addresses in the driver routines. If you are willing to do this, you may place the Light Pen card in any slot except #0. The addresses for the peeks and pokes can be calculated as follows:

address=old address + 16\*(slot #-5)

or in hexadecimal\*

\$C08X + \$N0

Where N is slot # and X is card address

The old addresses are:

START	POKE-16176,LINE	\$C0D0
DONE	PEEK(-16175)>127	\$C0D1
X>255	PEEK(-16172)>127	\$C0D4
X	PEEK(-16174)	\$C0D2
Y	PEEK(-16173)	\$C0D3
RING	PEEK(-16170)>127	\$C0D6

SLOT	1	2	3	4	6	7
Start	-16240	-16224	-16208	-16192	-16160	-16144
Done	-16239	-16223	-16207	-16191	-16159	-16143
X	-16238	-16222	-16206	-16190	-16158	-16142
Y	-16237	-16221	-16205	-16189	-16157	-16141
X>255	-16236	-16220	-16204	-16188	-16156	-16140
Ring	-16234	-16218	-16202	-16186	-16154	-16138

Or In Hexidecimal

SLOT	1	2	3	4	6	7
Start	CO90	COA0	COB0	COC0	COE0	COF0
Done	CO91	COA1	COB1	COC1	COE1	COF1
X	CO92	COA2	COB2	COC2	COE2	COF2
Y	CO93	COA3	COB3	COC3	COE3	COF3
X>255	CO94	COA4	COB4	COC4	COE4	COF4
Ring	CO96	COA6	COB6	COC6	COE6	COF6

## Section IV. APPENDICES

### APPENDIX 1 Subroutine Listings

Machine Code Pen Routine	16
Light Pen Draw	19
Catalog Select Program	32
Integer Pen Routine	42
Applesoft Pen Routine	43
Light Pen Concentration	44

```

0800      1          DCM "PR#1"
0800      2      ;
0800      3      ; MACHINE CODE LIGHT PFN DRIVER ROUTINE
0800      4      ; ON ENTRY
0800      5      ; RWAIT = 0 FOR NO PEN SWITCH WAIT
0800      6      ;          =-1 FOR PFN SWITCH WAIT
0800      7      ;
0800      8      ; ON EXIT:
0800      9      ; XHIGH,XLOW      = HI-RFS X COORD
0800     10      ; YLOW              = HI-RFS Y COORD
0800     11      ; XLORFS,YLORFS    = LORFS COORDS
0800     12      ; XTFXT YTFXT      = TFXC COORDS
0800     13      ;
0800 A9FF     14 LPEN      LDA #SFF                ;INIT MAX X-COORD
0802 8D3103   15          STA XHIGH
0805 8D3003   16          STA XLOW
0808 8D3203   17          STA YLOW
080B 8D3803   18          STA LINE
080E A528     19          LDA BASE                ;SAVE OLD TEXT BASE ADDRESS
0810 8596     20          STA OLDBAS
0812 A529     21          LDA BASE+1
0814 8597     22          STA OLDBAS+1
0816 EE3803   23 LOOP     INC LINE                ;INCREMENT PEN COORDINATES AROUND
0819 AD3803   24          LDA LINE                ;'TEARDROP' WINDOW UNTIL MINIMUM X IS
081C 8DD0C0   25          STA START                ;START PFN
081F 2CD1C0   26 WAIT     BIT DONE                ;WAIT FOR PFN TO GO DONE
0822 10FB     27          BPL WAIT
0824 2C3903   28          BIT RWAIT                ;IF PEN WAIT IS TRUE (-1)
0827 1005     29          BPL DNT
0829 2CD6C0   30          BIT RING                ;THEN WAIT FOR PFNSWITCH
082C 10F1     31          BPL WAIT
082E ADD4C0   32 DNT      LDA XOVL                ;GET X OVERFLOW VALUE (0 OR 1)
0831 2A       33          ROL
0832 A900     34          LDA #0
0834 2A       35          ROL
0835 CD3103   36          CMP XHIGH                ;CHECK IF WE HAVE NEW MINIMUM
0838 9008     37          BCC NEWC                ;SO WE CAN SFT UP TO FIND THE
083A ADD2C0   38          LDA XCOORD                ;NEXT VALUE OR SFF IF
083D CD3003   39          CMP XLOW                ;WE HAVE ALREADY HAD A SMALLEST X
0840 B019     40          BCS GREFT
0842 ADD4C0   41 NEWC     LDA XOVL                ;SFT UP A NEW MINIMUM VALUE
0845 2A       42          ROL
0846 A900     43          LDA #0
0848 2A       44          ROL
0849 8D3103   45          STA XHIGH
084C ADD2C0   46          LDA XCOORD
084F 8D3003   47          STA XLOW
0852 ADD3C0   48          LDA YCOORD
0855 8D3203   49          STA YLOW
0858 38       50          SEC
0859 B0BB     51          BCS LOOP                ;AND GET ANOTHER VALUE FROM PEN

```

085B		52	PAG	
085B AD3203	53	GRFST	LDA YLOW	;CALCULATE RFST OF COORDS
085F 4A	54		LSR	;XLOFBS = (XHIGH,XLOW)/7
085F 4A	55		LSR	;YLOFBS = YLOW/4
0860 8D3403	56		STA YLORES	;XTEXT = (XHIGH,XLOW)/7 + 1
0863 4A	57		LSR	;YTEXT = YLOW/8 + 1
0864 8D3603	58		STA YTEXT	
0867 A907	59		LDA #7	
0869 8D3F03	60		STA YH	
086C AD3103	61		LDA XHIGH	
086F 8D3D03	62		STA XH	
0872 AD3003	63		LDA XLOW	
0875 8D3C03	64		STA XL	
0878 A900	65	DIVIDE	LDA #0	;DIVIDE XH,XL/YH -> QUOTH
087A 8D3A03	66		STA QUOTL	
087D 8D3B03	67		STA QUOTH	
0880 8D3E03	68		STA YL	
0883 A010	69		LDY #16	;SIXTEEN BITS
0885 0E3A03	70	DIV2	ASL QUOTL	
0888 2E3B03	71		ROL QUOTH	
088B 2E3C03	72		ROL XL	
088F 2E3D03	73		ROL XH	
0891 38	74		SFC	
0892 AD3C03	75		LDA XL	
0895 ED3E03	76		SBC YL	
0898 AA	77		TAX	
0899 AD3D03	78		LDA XH	
089C FD3F03	79		SBC YH	
089F 9009	80		BCC DIV3	
08A1 8F3C03	81		STX XL	
08A4 8D3D03	82		STA XH	
08A7 EF3A03	83		INC QUOTL	
08AA 88	84	DIV3	DFY	
08AB D0D8	85		BNF DIV2	
08AD AD3B03	86		LDA QUOTH	;STORE QUOTIFNT IN X-COORD
08B0 8D3503	87		STA XTEXT	
08B3 8D3303	88		STA XLOFBS	
08B6 AD3603	89		LDA YTEXT	
08B9 20C1FB	90		JSR BASCAL	;GET THE CHARACTER OFF SCREEN
08BC AC3503	91		LDY XTEXT	
08BF B128	92		LDA (BASF),Y	
08C1 8D3703	93		STA CHAR	
08C4 EE3503	94		INC XTFTX	;TFTX COORD'S ARE RELATIVE
08C7 EF3603	95		INC YTEXT	;TO ONE NOT ZERO SO INCREMENT
08CA A596	96		LDA OLDBAS	;RFSTORE OLD TFTX BASF ADDRESS
08CC 8528	97		STA BASF	
08CF A597	98		LDA OLDBAS+1	
08D0 8529	99		STA BASF+1	
08D2 60	100		RTS	

8D3	101	PAG		
8D3	102	DONE	EQU \$C0D1	; PFN DONE FLAG
8D3	103	START	EQU \$C0D0	; START AT LINE 0
8D3	104	XOVFL	EQU \$C0D4	; X > 255 FLAG
8D3	105	XCOORD	EQU \$C0D2	; LOW X-COORD
8D3	106	YCOORD	EQU \$C0D3	; Y-COORD
8D3	107	RING	EQU \$C0D6	; TOUCH SWITCH FLAG
8D3	108	BASCAL	EQU \$FBC1	; CALCULATE TEXT BASE ADDRESS AT BASE
8D3	109	BASE	FPZ \$28	; TEXT LINE BASE ADDRESS
8D3	110	OLDBAS	FPZ \$96	
8D3	111	XLOW	EQU \$330	; X RETURN COORDINATE
8D3	112	XHIGH	EQU \$331	; HIGH PART OF X
8D3	113	YLOW	EQU \$332	; HIRFS Y-COORD
8D3	114	XLORFS	EQU \$333	; LORFS X-COORD
8D3	115	YLORFS	EQU \$334	; LORFS Y-COORD
8D3	116	XTFXT	EQU \$335	; X TFXT COORD
8D3	117	YTFXT	EQU \$336	; Y TEXT COORD
8D3	118	CHAR	EQU \$337	; CHARACTER AT TEXT COORD. X,Y
8D3	119	LINE	EQU \$338	; SCAN LINE OF 'TEARDROP' WINDOW OF MIN
8D3	120	RWAIT	EQU \$339	; PARAMETER TO WAIT FOR PFN SWITCH
8D3	121	QUOTL	EQU \$33A	
8D3	122	QUOTH	EQU \$33B	
8D3	123	XL	EQU \$33C	
8D3	124	XH	EQU \$33D	
8D3	125	YL	EQU \$33E	
8D3	126	YH	EQU \$33F	
8D3	127	LENGTH	EQU *-LPEN	
	128	END		

\*\*\*\* END OF ASSEMBLY

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*
* SYMBOL TABLE -- V 1.5 *
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ABFL. LOC. LABFL. LOC. LABFL. LOC.

\* ZFRO PAGE VARIABLES:

BASE 0028 OLDBAS 0096

\* ABSOLUTE VARIABLES/LABELS

LPEN	0800	LOOP	0816	WAIT	081F	DNT	082E			
EWFC	0842	GREST	085B	DIVIDE	0878	DIV2	0885	DIV3	08AA	DONE C0D1
START	C0D0	XOVFL	C0D4	XCOORD	C0D2	YCOORD	C0D3	RING	C0D6	BASCAL FBC1
XLOW	0330	XHIGH	0331	YLOW	0332	XLORFS	0333	YLORES	0334	XTEXT 0335
YTEXT	0336	CHAR	0337	LINE	0338	RWAIT	0339	QUOTL	033A	QUOTH 033B
XL	033C	XH	033D	YL	033E	YH	033F	LENGTH	00D3	

SYMBOL TABLE STARTING ADDRESS:5800

SYMBOL TABLE LENGTH:012A

0800	1	DCM "PR#1"	
0900	2	ORG \$0900	
0900	3	;	
0900	4	; LIGHT PEN HIRES DRAW SUBROUTINE PACKAGE	
0900	5	; WITH AVERAGING	
0900	6	;	
0900 20DA0A	7	MAIN JSR INIT	;CLEAR SCREEN
0903 A9FF	8	LDA #\$FF	;HCOLOR = WHITE
0905 8DE90C	9	STA HCLR1	
0908 8DF60C	10	STA HCOLOR	
090B A9BD	11	LDA #\$BD	;DRAW CLEARING LINE AT BOTTOM
090D 8DED09	12	STA YP	
0910 ADED09	13	STLP LDA YP	
0913 A200	14	LDX #0	
0915 A000	15	LDY #0	
0917 20140B	16	JSR HPOSN	
091A A917	17	LDA #23	
091C A201	18	LDX #1	
091E ACED09	19	LDY YP	
0921 20500C	20	JSR HLIN	
0924 EEED09	21	INC YP	
0927 ADED09	22	LDA YP	
092A C9C0	23	CMP #\$C0	
092C D0F2	24	BNF STLP	
092F A900	25	ST1 LDA #0	;ZFRO TOTALS
0930 8DF709	26	STA XA	
0933 8DF809	27	STA XA+1	
0936 8DF909	28	STA YA	
0939 8DFA09	29	STA YA+1	
093C A208	30	LDX #8	;GFT A LIGHT PEN NUMBER
093E 208B0A	31	LOOP1 JSR LPFN	
0941 ADE709	32	LDA XA	
0944 6DD50A	33	ADC XLOW	
0947 8DE709	34	STA XA	
094A ADE809	35	LDA XA+1	
094D 6DD60A	36	ADC XHIGH	
0950 8DE809	37	STA XA+1	
0953 18	38	CLC	;YA = YA + YLOW
0954 ADE909	39	LDA YA	
0957 6DD70A	40	ADC YLOW	
095A 8DE909	41	STA YA	
095D A900	42	LDA #0	
095F 6DEA09	43	ADC YA+1	
0962 8DEA09	44	STA YA+1	
0965 CA	45	DEX	;IF LAST ONE THE PLOT
0966 D0D6	46	BNF LOOP1	
0968 ADE909	47	LDA YA	;YP = YA
096B 8DED09	48	STA YP	
096E ADEA09	49	LDA YA+1	
0971 8DEE09	50	STA YP+1	
0974 ADE709	51	LDA XA	;XP = XA
0977 8DFB09	52	STA XP	
097A ADE809	53	LDA XA+1	
097D 8DFC09	54	STA XP+1	
0980 20F209	55	JSR DIV8	;XP=XP/8 : YP=YP/8
0983 ADED09	56	LDA YP	;NOW PLOT THE POINT
0986 AEFB09	57	LDX XP	
0989 ACEC09	58	LDY XP+1	
098C 20620B	59	JSR HPLOT	

098F	60		PAG	
098F 208B0A	61	LOOPM	JSR LPEN	;NOW GET REST OF POINTS
0992 2CD6C0	62		BIT RING	
0995 303B	63		BMI WTRING	
0997 ADD70A	64		LDA YLOW	;CLEAR SCREEN IF Y>188
099A C9BD	65		CMP #\$BD	
099C 9003	66		BCC ST23	
099E 4C0009	67		JMP MAIN	
09A1 20060A	68	ST23	JSR MPY7	;XP = (7*XP + ZX)
09A4 18	69		CLC	
09A5 ADEB09	70		LDA XP	
09A8 6DD50A	71		ADC XLOW	
09AB 8DEB09	72		STA XP	
09AF ADEC09	73		LDA XP+1	
09B1 6DD60A	74		ADC XHIGH	
09B4 8DFC09	75		STA XP+1	
09B7 18	76		CLC	;YP = (7*YP + ZY)
09B8 ADED09	77		LDA YP	
09BB 6DD70A	78		ADC YLOW	
09BE 8DED09	79		STA YP	
09C1 ADFF09	80		LDA YP+1	
09C4 6900	81		ADC #0	
09C6 8DEF09	82		STA YP+1	
09C9 20F209	83		JSR DIV8	;XP=XP/8 : YP=YP/8
09CC 205C0A	84		JSR PLOTP	;NOW PLOT
09CF 4C8F09	85		JMP LOOPM	
09D2 2CD6C0	86	WTRING	BIT RING	
09D5 30FB	87		BMI WTRING	
09D7 4C2E09	88		JMP ST1	
09DA AD56C0	89	RETURN	LDA \$C056	
09DD AD54C0	90		LDA \$C054	
09E0 AD53C0	91		LDA \$C053	
09F3 AD51C0	92		LDA \$C051	
09E6 60	93		RTS	
09E7 0000	94	XA	HFX 0000	
09E9 0000	95	YA	HFX 0000	
09EB 0000	96	XP	HFX 0000	
09ED 0000	97	YP	HFX 0000	
09FF 00	98	T1	HEX 00	
09F0 00	99	T2	HFX 00	
09F1 00	100	T3	HFX 00	

09F2	101		PAG	
09F2	102	;		
09F2	103	;	DIVIDE XP,YP BY 8	
09F2	104	;		
09F2 A203	105	DIV8	LDX #3	;SHIFT RIGHT 3 TIMES
09F4 18	106	DIVL	CLC	
09F5 6EEC09	107		ROR XP+1	
09F8 6EFB09	108		ROR XP	
09FB 18	109		CLC	
09FC 6EEE09	110		ROR YP+1	
09FF 6EED09	111		ROR YP	
0A02 CA	112		DFX	
0A03 D0EF	113		BNE DIVL	
0A05 60	114		RTS	
0A06	115	;		
0A06	116	;	MULTIPLY XP,YP BY 7	
0A06	117	;		
0A06 A202	118	MPY7	LDX #2	
0A08 ADEB09	119		LDA XP	
0A0B 8D580A	120		STA XT	
0A0E ADEC09	121		LDA XP+1	
0A11 8D590A	122		STA XT+1	
0A14 ADED09	123		LDA YP	
0A17 8D5A0A	124		STA YT	
0A1A ADEE09	125		LDA YP+1	
0A1D 8D5B0A	126		STA YT+1	
0A20 18	127	MPYL	CLC	
0A21 2F580A	128		ROL XT	
0A24 2F590A	129		ROL XT+1	
0A27 18	130		CLC	
0A28 2E5A0A	131		ROL YT	
0A2B 2E5B0A	132		ROL YT+1	
0A2F 18	133		CLC	
0A2F ADFB09	134		LDA XP	
0A32 6D580A	135		ADC XT	
0A35 8DFB09	136		STA XP	
0A38 ADFC09	137		LDA XP+1	
0A3B 6D590A	138		ADC XT+1	
0A3E 8DEC09	139		STA XP+1	
0A41 18	140		CLC	
0A42 ADED09	141		LDA YP	
0A45 6D5A0A	142		ADC YT	
0A48 8DFD09	143		STA YP	
0A4B ADEE09	144		LDA YP+1	
0A4E 6D5B0A	145		ADC YT+1	
0A51 8DEF09	146		STA YP+1	
0A54 CA	147		DFX	
0A55 D0C9	148		BNE MPYL	
0A57 60	149		RTS	
0A58 0000	150	XT	ADR \$0000	
0A5A 0000	151	YT	ADR \$0000	



0A5C	152		PAG
0A5C	153	;	
0A5C	154	;	PLOT HLIN TO X,Y
0A5C	155	;	
0A5C ADED09	156	PLOTP	LDA YP
0A5F C9BD	157		CMP #\$BD
0A61 9005	158		BCC PP1
0A63 A9BC	159		LDA #\$BC
0A65 8DED09	160		STA YP
0A68 ADEC09	161	PP1	LDA XP+1
0A6B F011	162		BEQ PP3
0A6D ADEB09	163		LDA XP
0A70 C916	164		CMP #\$16
0A72 900A	165		BCC PP3
0A74 A901	166		LDA #1
0A76 8DFC09	167		STA XP+1
0A79 A916	168		LDA #\$16
0A7B 8DFB09	169		STA XP
0A7E ADEB09	170	PP3	LDA XP
0A81 AFEC09	171		LDX XP+1
0A84 ACED09	172		LDY YP
0A87 20500C	173		JSR HLIN
0A8A 60	174		RTS

0A8B	175		PAG	
0A8B	176		;	
0A8B	177		; MACHINE CODE LIGHT PEN DRIVER ROUTINE	
0A8B	178		;	
0A8B	179		; ON EXIT:	
0A8B	180		; XHIGH,XLOW	= HI-RES X COORD
0A8B	181		; YLOW	= HI-RES Y COORD
0A8B	182		;	
0A8B A9FF	183	LPEN	LDA #\$FF	
0A8D 8DD60A	184		STA XHIGH	
0A90 8DD50A	185		STA XLOW	
0A93 8DD70A	186		STA YLOW	
0A96 8DD80A	187		STA LINE	;LOOP FOR PEN COORDINATES
0A99 EED80A	188	LOOP	INC LINE	;INCREMENT AROUND 'TFARDROP'
0A9C ADD80A	189		LDA LINE	;UNTIL MINIMUM X IS FOUND
0A9F 8DD0C0	190		STA START	;START PEN AT LINE Q
0AA2 2CD1C0	191	WAIT	BIT DONE	;WAIT FOR PEN TO GO DONE
0AA5 10FB	192		BPL WAIT	
0AA7 ADD4C0	193	DNT	LDA XOVL	;GET X OVERFLOW VALUE (0 OR 1)
0AAA 2A	194		ROL	
0AAB A900	195		LDA #0	
0AAD 2A	196		ROL	
0AAE CDD60A	197		CMP XHIGH	;IF LOWER THAN OLD X
0AB1 9009	198		BCC NEWC	;THEN SET NEW MINIMUM X COORD
0AB3 ADD2C0	199		LDA XCOORD	
0AB6 CDD50A	200		CMP XLOW	
0AB9 9001	201		BCC NEWC	
0ABB 60	202		RTS	
0ABC ADD4C0	203	NEWC	LDA XOVL	;SET UP A NEW MINIMUM VALUF
0ABF 2A	204		ROL	
0AC0 A900	205		LDA #0	
0AC2 2A	206		ROL	
0AC3 8DD60A	207		STA XHIGH	
0AC6 ADD2C0	208		LDA XCOORD	
0AC9 8DD50A	209		STA XLOW	
0ACC ADD3C0	210		LDA YCOORD	
0ACF 8DD70A	211		STA YLOW	
0AD2 4C990A	212		JMP LOOP	;AND GET ANOTHER VALUF FROM PEN
0AD5	213	DONF	FQU \$C0D1	
0AD5	214	START	FQU \$C0D0	
0AD5	215	XOVL	FQU \$C0D4	
0AD5	216	XCOORD	FQU \$C0D2	
0AD5	217	YCOORD	FQU \$C0D3	
0AD5	218	RING	FQU \$C0D6	
0AD5	219	BASCAL	FQU \$FBC1	
0AD5 00	220	XLOW	HEX 00	
0AD6 00	221	XHIGH	HEX 00	
0AD7 00	222	YLOW	HEX 00	
0AD8 00	223	LINE	HEX 00	
0AD9 00	224	RWAIT	HEX 00	

0ADA	225	PAG	
0ADA	226		;
0ADA	227		; INITIALIZE SCREEN
0ADA	228		;
0ADA A940	229	INIT	LDA #\$40 ;INIT PAGE 2
0ADC 8DF80C	230		STA HPAG
0ADF AD57C0	231		LDA HIRES ;SET HIRES DISPLAY MODE
0AE2 AD52C0	232		LDA \$C052 ;NO TEXT
0AE5 AD55C0	233		LDA \$C055 ;PAGE 2
0AE8 AD50C0	234		LDA TXTCLR ;SET GRAPHICS DISPLAY MODE
0AEB A900	235	HCLR	LDA #0 ;SET FOR BLACK BACKGROUND
0AED 8DE90C	236	BKGND0	STA HCLR1
0AF0 ADF80C	237	BKGND	LDA HPAG
0AF3 85E9	238		STA SHAPEH ;INIT HI-RES SCREEN MEMORY
0AF5 0910	239		ORA #\$10
0AF7 85E1	240		STA HBASH
0AF9 A000	241		LDY #0 ;FOR CURRENT PAGE, NORMALLY
0AFB 84E0	242		STY HBASL
0AFD 84E8	243		STY SHAPEL ;\$2000-3FFF OR \$4000-5FFF
0AFF ADF90C	244	BKGND1	LDA HCLR1
0B02 91E8	245		STA (SHAPFL),Y
0B04 91E0	246		STA (HBASL),Y
0B06 C8	247		INY
0B07 D0F6	248		BNE BKGND1
0B09 E6E9	249		INC SHAPEH
0B0B F6E1	250		INC HBASH
0B0D A5E1	251		LDA HBASH
0B0F 291F	252		AND #\$1F
0B11 D0EC	253		BNE BKGND1
0B13 60	254		RTS

0B14	255	PAG
0B14	256	;
0B14	257	; HI=RES GRAPHICS POSITION AND
0B14	258	; PLOT SUBROUTINF5
0B14	259	;
0B14	260	; ENTFR:
0B14	261	; Y - A RFG.
0B14	262	; XL- X RFG.
0B14	263	; XH- Y RFG.
0B14 8DF50C	264	HPOSN STA YO
0B17 8EF30C	265	STX XOL
0B1A 8CF40C	266	STY XOH
0B1D 48	267	PHA
0B1F 29C0	268	AND #5C0
0B20 85E0	269	STA HBASL
0B22 4A	270	LSR
0B23 4A	271	LSR
0B24 05E0	272	ORA HBASL
0B26 85E0	273	STA HBASL
0B28 68	274	PLA
0B29 85E1	275	STA HBASH
0B2B 0A	276	ASL
0B2C 0A	277	ASL
0B2D 0A	278	ASL
0B2E 26E1	279	ROL HBASH
0B30 0A	280	ASL
0B31 26E1	281	ROL HBASH
0B33 0A	282	ASL
0B34 66E0	283	ROR HBASL
0B36 A5E1	284	LDA HBASH
0B38 291F	285	AND #51F
0B3A 0DF80C	286	ORA HPAG
0B3D 85E1	287	STA HBASH
0B3F 8A	288	TXA
0B40 C000	289	CPY #0
0B42 F005	290	BEQ HPOSN2
0B44 A023	291	LDY #523
0B46 6904	292	ADC #4
0B48 C8	293	HPOSN1 INY
0B49 F907	294	HPOSN2 SBC #507
0B4B B0FB	295	BCS HPOSN1
0B4D 8CF70C	296	STY HNDX
0B50 AA	297	TAX
0B51 BD020C	298	LDA MSKTEL-\$F9,X
0B54 8DEB0C	299	STA HMASK
0B57 98	300	TYA
0B58 4A	301	LSR
0B59 ADF60C	302	LDA HCOLOR
0B5C 8DE90C	303	HPOSN3 STA HCLR1
0B5F B02F	304	BCS CSHFT2
0B61 60	305	RTS
0B62	306	;
0B62 20140B	307	HPLLOT JSR HPOSN
0B65 ADF90C	308	LDA HCLR1
0B68 51E0	309	EOR (HBASL),Y
0B6A 2DEB0C	310	AND HMASK
0B6D 51E0	311	EOR (HBASL),Y
0B6F 91E0	312	STA (HBASL),Y
0B71 60	313	RTS

0B72	314	PAG
0B72	315	;
0B72	316	; L,R,U,D SUBROUTINES
0B72	317	;
0B72 102A	318	LFTRT BPL RIGHT
0B74 ADEB0C	319	LEFT LDA HMASK
0B77 4A	320	LSR
0B78 B006	321	BCS LEFT1
0B7A 49C0	322	FOR #\$C0
0B7C 8DEB0C	323	LR1 STA HMASK
0B7F 60	324	RTS
0B80 88	325	LEFT1 DEY
0B81 1002	326	BPL LFFT2
0B83 A027	327	LDY #\$27
0B85 A9C0	328	LEFT2 LDA #\$C0
0B87 8DEB0C	329	NEWNDX STA HMASK
0B8A 8CF70C	330	STY HNDX
0B8D ADE90C	331	CSHIFT LDA HCLR1
0B90 0A	332	CSHFT2 ASL
0B91 C9C0	333	CMP #\$C0
0B93 1008	334	BPL RTS1
0B95 ADE90C	335	LDA HCLR1
0B98 497F	336	FOR #\$7F
0B9A 8DE90C	337	STA HCLR1
0B9D 60	338	RTS1 RTS
0B9E ADEB0C	339	RIGHT LDA HMASK
0BA1 0A	340	ASL
0BA2 4980	341	FOR #\$80
0BA4 30D6	342	BMI LR1
0BA6 A981	343	LDA #\$81
0BA8 C8	344	INY
0BA9 C028	345	CPY #\$28
0BAB 90DA	346	BCC NEWNDX
0BAD A000	347	LDY #\$00
0BAF B0D6	348	BCS NEWNDX
0BB1 18	349	LRUDX1 CLC
0BB2 ADEF0C	350	LRUDX2 LDA SHAPFX
0BB5 2904	351	AND #\$04
0BB7 F02C	352	BEQ LRUD4
0BB9 A97F	353	LDA #\$7F
0BBB 2DEB0C	354	AND HMASK
0BBE 31E0	355	AND (HBASL),Y
0BC0 D01F	356	BNE LRUD3
0BC2 EFA0C	357	INC COLLN
0BC5 A97F	358	LDA #\$7F
0BC7 2DEB0C	359	AND HMASK
0BCA 1015	360	BPL LRUD3
0BCC 18	361	LRUD1 CLC
0BCD ADEF0C	362	LRUD2 LDA SHAPFX
0BD0 2904	363	AND #\$04
0BD2 F011	364	BEQ LRUD4
0BD4 B1E0	365	LDA (HBASL),Y
0BD6 4DE90C	366	FOR HCLR1
0BD9 2DFB0C	367	AND HMASK
0BDC D003	368	BNE LRUD3
0BDE EFA0C	369	INC COLLN
0BE1 51E0	370	LRUD3 FOR (HBASL),Y
0BE3 91E0	371	STA (HBASL),Y

0BE5		372		PAG
0BE5 ADEF0C		373	LRUD4	LDA SHAPEX
0BE8 6DF00C		374		ADC QDRNT
0BEB 2903		375		AND #3
0BED		376	EQ3	FQU *-1
0BED C902		377		CMP #2
0BEF 6A		378		ROR
0BF0 B080		379	LRUD	BCS LFTRT
0BF2 3030		380	UPDOWN	BMI DOWN4
0BF4 18		381	UP	CLC
0BF5 A5F1		382		LDA HBASH
0BF7 2C020D		383		BIT FQ1C
0BFA D022		384		BNE UP4
0BFC 06E0		385		ASL HBASL
0BFE B01A		386		BCS UP2
0C00 2CFC0B		387		BIT FQ3
0C03 F005		388		BFQ UP1
0C05 691F		389		ADC #\$1F
0C07 38		390		SFC
0C08 B012		391		BCS UP3
0C0A 6923		392	UP1	ADC #\$23
0C0C 48		393		PHA
0C0D A5E0		394		LDA HBASL
0C0F 69B0		395		ADC #\$B0
0C11 B002		396		BCS UP5
0C13 69F0		397		ADC #\$F0
0C15 85E0		398	UP5	STA HBASL
0C17 68		399		PLA
0C18 B002		400		BCS UP3
0C1A 691F		401	UP2	ADC #\$1F
0C1C 66E0		402	UP3	ROR HBASL
0C1E 69FC		403	UP4	ADC #\$FC
0C20 85E1		404	UPDOWN1	STA HBASH
0C22 60		405		RTS
0C23 18		406	DOWN	CLC
0C24 A5E1		407	DOWN4	LDA HBASH
0C26 6904		408		ADC #\$04
0C28		409	FQ4	FQU *-\$01
0C28 2C020D		410		BIT FQ1C
0C2B D0F3		411		BNE UPDOWN1
0C2D 06F0		412		ASL HBASL
0C2F 9019		413		BCC DOWN1
0C31 69E0		414		ADC #\$E0
0C33 18		415		CLC
0C34 2C270C		416		BIT FQ4
0C37 F013		417		BFQ DOWN2
0C39 A5E0		418		LDA HBASL
0C3B 6950		419		ADC #\$50
0C3D 49F0		420		EOR #\$F0
0C3F F002		421		BFQ DOWN3
0C41 49F0		422		EOR #\$F0
0C43 85E0		423	DOWN3	STA HBASL
0C45 ADF80C		424		LDA HPAG
0C48 9002		425		BCC DOWN2
0C4A 69E0		426	DOWN1	ADC #\$E0
0C4C 66E0		427	DOWN2	ROR HBASL
0C4E 90D0		428		BCC UPDOWN1

0C50	429		PAG
0C50	430		;
0C50	431		; LINE DRAW SUBROUTINF5
0C50	432		;
0C50	433		; ON ENTRY:
0C50	434		; XL - A REG
0C50	435		; XH - X REG
0C50	436		; Y - Y REG
0C50 48	437	HLIN	PHA
0C51 38	438		SEC
0C52 EDF30C	439		SBC X0L
0C55 48	440		PHA
0C56 8A	441		TXA
0C57 EDF40C	442		SBC X0H
0C5A 8DF00C	443		STA QDRNT
0C5D B00B	444		BCS HLIN2
0C5F 68	445		PLA
0C60 49FF	446		FOR #\$FF
0C62 6901	447		ADC #\$01
0C64 48	448		PHA
0C65 A900	449		LDA #\$00
0C67 EDF00C	450		SBC QDRNT
0C6A 8DEF0C	451	HLIN2	STA DXH
0C6D 8DF20C	452		STA FH
0C70 68	453		PLA
0C71 8DFC0C	454		STA DXL
0C74 8DF10C	455		STA FL
0C77 68	456		PLA
0C78 8DF30C	457		STA X0L
0C7B 8EF40C	458		STX X0H
0C7E 98	459		TYA
0C7F 18	460		CLC
0C80 EDF50C	461		SBC Y0
0C83 9004	462		BCC HLIN3
0C85 49FF	463		FOR #\$FF
0C87 69FE	464		ADC #\$FF
0C89 8DEE0C	465	HLIN3	STA DY
0C8C 8CF50C	466		STY Y0
0C8F 6EF00C	467		ROR QDRNT
0C92 38	468		SFC
0C93 EDEC0C	469		SBC DXL
0C96 AA	470		TAX
0C97 A9FF	471		LDA #\$FF
0C99 EDED0C	472		SBC DXH
0C9C 8DEA0C	473		STA COUNTH
0C9F ACF70C	474		LDY HNDX
0CA2 B005	475		BCS MOVEX2
0CA4 0A	476	MOVEX	ASL
0CA5 20720B	477		JSR LFTRT
0CA8 38	478		SFC
0CA9 ADF10C	479	MOVEX2	LDA FL
0CAC 6DFF0C	480		ADC DY
0CAF 8DF10C	481		STA FL
0CB2 ADF20C	482		LDA FH
0CB5 F900	483		SBC #0

OCB7		484		PAG
OCB7	8DF20C	485	HCOUNT	STA FH
OCBA	B1E0	486		LDA (HBASL),Y
OCBC	4DF90C	487		EOR HCLR1
OCBF	2DEB0C	488		AND HMASK
OCC2	51E0	489		EOR (HBASL),Y
OCC4	91E0	490		STA (HBASL),Y
OCC6	E8	491		INX
OCC7	D005	492		BNE HLIN4
OCC9	EEEE0C	493		INC COUNTH
CCCC	F01A	494		BFQ RTS2
OCCE	ADF00C	495	HLIN4	LDA QDRNT
0CD1	B0D1	496		BCS MOVEX
0CD3	20F20B	497		JSR UPDWN
0CD6	18	498		CLC
0CD7	ADF10C	499		LDA FL
OCDA	6DFC0C	500		ADC DXL
OCDD	8DF10C	501		STA FL
OCF0	ADF20C	502		LDA FH
OCF3	6DFD0C	503		ADC DXH
OCF6	50CF	504		BVC HCOUNT
0CE8	60	505	RTS2	RTS



0CE9	506	PAG	
0CE9	507	;	
0CE9	508	; FQUATES	
0CE9	509	;	
0CE9	510	SHAPEL	FPZ \$E8
0CE9	511	SHAPEH	FPZ \$E9
0CF9 00	512	HCLR1	HFX 00
0CEA 00	513	COUNTH	HEX 00
0CEB	514	HBASL	FPZ \$E0
0CEB	515	HBASH	FPZ \$E1
0CEB 00	516	HMASK	HFX 00
0CFC 00	517	DXL	HFX 00
0CED 00	518	DXH	HFX 00
0CEE 00	519	DY	HFX 00
0CEF 00	520	SHAPEX	HEX 00
0CF0 00	521	QDRNT	HEX 00
0CF1 00	522	EL	HEX 00
0CF2 00	523	EH	HEX 00
0CF3 00	524	X0L	HEX 00
0CF4 00	525	X0H	HEX 00
0CF5 00	526	Y0	HEX 00
0CF6 00	527	HCOLOR	HEX 00
0CF7 00	528	HNDX	HEX 00
0CF8 00	529	HPAG	HEX 00
0CF9 00	530	SCALE	HFX 00
0CFA 00	531	COLLSN	HEX 00
0CFB 818284	532	MSKTBL	HFX 8182848890A0C0
0CFF 8890A0			
0D01 C0			
0D02 1C	533	FQ1C	HEX 1C
0D03 FFFEFA	534	COS	HFX FFFEFAF4ECF1D4C5
0D06 F4ECF1			
0D09 D4C5			
0D0B B4A18D	535		HFX B4A18D7861493118FF
0D0E 786149			
0D11 3118FF			
0D14	536	HIRES	EQU \$C057
0D14	537	MIXSFT	EQU \$C053
0D14	538	TXTCLR	EQU \$C050
0D14	539	LENGTH	EQU *-MAIN

540  
541

```
*****
*
* SYMBOL TABLE -- V 1.5 *
*
*****
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\*\* ZERO PAGE VARIABLES:

\*\* ABSOLUTE VARIABLES/LABFLS

SYMBOL TABLE STARTING ADDRESS:5800  
SYMBOL TABLE LENGTH:03D2

! PR#0  
PR#0

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0800          1          DCM "PR#1"
0900          2          ORG $0900
0900          3          ;
0900          4          ; THIS PROGRAM WILL PRINT OUT THE ENTIRE CATALOG IN SECTIONS
0900          5          ; AND WAIT FOR THE USER TO SELECT A FILE TO RUN WITH THE
0900          6          ; LIGHT PEN. IF THE USER PAGES THROUGH THE WHOLE CATALOG
0900          7          ; WITHOUT SELECTING ANYTHING, THE PROGRAM WILL END.
0900          8          ;
0900 2058FC      9  CONTRL JSR HOME
0903 A900       10         LDA #0
0905 8D3903     11         STA RWAIT          ;SET UP RING WAIT
0908 8D0F0C     12         STA INDEX
090B 20170A     13         JSR GETCUR          ;GET CURRENT SLOT AND DRIVE
090E 20F309     14         JSR CAT
0911 A949       15         LDA #BUFFER        ;SET UP BUFFER POINTER
0913 85FE       16         STA BUFPTR
0915 A90C       17         LDA /BUFFER
0917 85FF       18         STA BUFPTR+1
0919           19          ;
0919           20          CTRLP:
0919 2058FC     21         JSR HOME          ;CLEAR THE SCREEN
091C 20320A     22         JSR CAT1          ;PRINT 15 FILES
091F A999       23         LDA #MESS
0921 A00B       24         LDY /MESS
0923 20B10A     25         JSR PBUFF
0926 AD130C     26         LDA OLDY          ;GET INITIAL CHAR AT X,Y
0929 20C1FB     27         JSR BASCAL
092C AC120C     28         LDY OLDX
092F B128       29         LDA (BASE),Y
0931 8D140C     30         STA TFMF
0934           31          ;
0934           32          CTRL:
0934 20C60A     33         JSR LPFN          ; AND WAIT FOR USER RESPONSE
0937 CF3603     34         DFC YTFXT        ;DECREMENT FOR M.C. PURPOSES
093A AD120C     35         LDA OLDX
093D CD3503     36         CMP XTEXT
0940 D008       37         BNF CHANGE
0942 AD130C     38         LDA OLDY
0945 CD3603     39         CMP YTFXT
0948 F028       40         BEQ CTR2
094A           41          ;
094A           42          CHANGE:
094A AD130C     43         LDA OLDY
094D 20C1FB     44         JSR BASCAL
0950 AC120C     45         LDY OLDX
0953 AD140C     46         LDA TFMF
0956 9128       47         STA (BASE),Y
0958 AD3603     48         LDA YTEXT
095B 8D130C     49         STA OLDY
095E 20C1FB     50         JSR BASCAL
0961 AC3503     51         LDY XTEXT
0964 8C120C     52         STY OLDX
0967 B128       53         LDA (BASE),Y
0969 8D140C     54         STA TFMF
096C 293F       55         AND #$3F
096E 0940       56         ORA #$40
0970 9128       57         STA (BASE),Y

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0972	58	PAG	
0972	59	;	
0972	60	CTR2:	
0972 2CD6C0	61	BIT RING	
0975 10BD	62	BPL CTR1	
0977 AE3603	63	LDX YTEXT	;CHECK Y COORD AGAINST
097A CA	64	DEX	; THE NUMBER OF FILES PRINTED OUT
097B EC100C	65	CPX COUNT	; TO SEE IF THE LIGHT PEN
097E B046	66	BCS CTR3	; WAS ON ONE OF THE FILFS
0980 8A	67	TXA	;POINT TO FILE DESCRIPTOR
0981 0A	68	ASL	
0982 AA	69	TAX	
0983 BD160C	70	LDA PTRS,X	
0986 85FA	71	STA POINT	
0988 E8	72	INX	
0989 BD160C	73	LDA PTRS,X	
098C 85FB	74	STA POINT+1	
098E A002	75	LDY #2	;CHECK IF A GOOD FILE TO RUN
0990 B1FA	76	LDA (POINT),Y	
0992 2907	77	AND #7	;CAN'T RUN ANYTHING BUT
0994 F03E	78	BEQ FILFRR	; INT, APPL, BINARY
0996 48	79	PHA	
0997 2039FB	80	JSR SETTXT	;SFTUP FOR NORMAL OPERATION
099A 2058FC	81	JSR HOMF	
099D 68	82	PLA	
099E 2904	83	AND #4	;CHECK IF BASIC OR BINARY
09A0 F00A	84	BFQ BASIC	
09A2 A9E1	85	LDA #BRUN	
09A4 A00B	86	LDY /BRUN	
09A6 20B10A	87	JSR PBUFF	
09A9 4CB309	88	JMP PFILE	;PRINT FILE NAME
09AC	89	;	
09AC	90	BASIC:	
09AC A9EA	91	LDA #RUN	;RUN THE BASIC FILE
09AE A00B	92	LDY /RUN	
09B0 20B10A	93	JSR PBUFF	
09B3	94	;	
09B3 A003	95	PFILE LDY #3	;PRINT OUT FILE NAME
09B5 A21E	96	LDX #30	
09B7 B1FA	97	PFLP LDA (POINT),Y	
09B9 20EDFD	98	JSR PUTC	
09BC C8	99	INY	
09BD CA	100	DEX	
09BE D0F7	101	BNF PFLP	
09C0 A98D	102	LDA #S8D	
09C2 20EDFD	103	JSR PUTC	;RUN THE FILE
09C5 60	104	RTS	
09C6	105	;	
09C6	106	CTR3:	
09C6 A900	107	LDA #0	;WAIT FOR USER
09C8 20A8FC	108	JSR WAIT1	
09CB 2C110C	109	BIT FOB	;CHECK FOR FND OF CATALOG
09CF 3003	110	BMI CTREX	
09D0 4C1909	111	JMP CTRLP	
09D3 60	112	CTREX RTS	

09D4	113	PAG	
09D4	114	;	
09D4	115	FILERR:	
09D4 A914	116	LDA #20	;TAB DOWN TO LINE 20
09D6 2024FC	117	JSR VTAB	
09D9 A900	118	LDA #0	
09DB 8524	119	STA CSRHRZ	
09DD A9F2	120	LDA #FRR	; AND PRINT FRROR MESSAGE
09DF A00B	121	LDY /FRR	
09F1 20B10A	122	JSR PBUFF	
09E4 A900	123	LDA #0	
09E6 20A8FC	124	JSR WAIT1	;WAIT FOR USER RFAD
09F9 A900	125	LDA #0	; AND FRASF THF LINF
09FB 8524	126	STA CSRHRZ	
09ED 209CFC	127	JSR FRFOL	
09F0 4C7209	128	JMP CTR2	
09F3	129	;	
09F3	130	;	
09F3	131	;	
09F3	132	; READ IN CATALOG TRACK OFF DISK	
09F3	133	;	
09F3	134	CAT:	
09F3 A90C	135	LDA /BUFFER	;SELECT BUFFER POINTER
09F5 8D3D0C	136	STA BUF+1	
09F8 A911	137	LDA #\$11	;TRACK NUMBFR
09FA 8D380C	138	STA TRACK	
09FD A90C	139	LDA #\$C	;SECTOR NUMBER
09FF 8D390C	140	STA SECTOR	
0A02 A901	141	LDA 01	
0A04 8D400C	142	STA CMD	
0A07 A90C	143	CLOOP LDA /IOB	
0A09 A034	144	LDY #IOB	
0A0B 2000BD	145	JSR \$BD00	
0A0F FF3D0C	146	INC BUF+1	;INCRFMFNT BUFFFR ADDRESS
0A11 CF390C	147	DFC SECTOR	
0A14 D0F1	148	BNF CLOOP	
0A16 60	149	RTS	
0A17	150	;	
0A17	151	;	
0A17	152	; GET CURRENT SLOT AND DRIVE	
0A17	153	;	
0A17 20F303	154	GETCUR JSR GETIOB	;GET IOCB
0A1A 85FF	155	STA BUFPTR+1	
0A1C 84FE	156	STY BUFPTR	
0A1E A00F	157	LDY #\$F	;GET DRIVE AND SLOT
0A20 B1FE	158	LDA (BUFPTR),Y	
0A22 8D430C	159	STA PRVSLT	
0A25 8D350C	160	STA SLOT	
0A28 C8	161	INY	
0A29 B1FE	162	LDA (BUFPTR),Y	
0A2B 8D440C	163	STA PRVDRV	
0A2E 8D360C	164	STA DRIVE	
0A31 60	165	RTS	

0A32	166	PAG	
0A32	167	;	
0A32	168	;	PRINT OUT SFGMENT OF CATALOG (15 FILFS MAX)
0A32	169	;	
0A32	170	CAT1:	
0A32 A900	171	LDA #0	;INIT COUNT OF FILES
0A34 8D100C	172	STA COUNT	
0A37 8D110C	173	STA EOB	;END OF BUFEER = FALSE
0A3A A98D	174	LDA #\$8D	;SPACE DOWN ONF LINF
0A3C 20FDFD	175	JSR PUTC	; FROM THE TOP
0A3F AD0F0C	176	LDA INDFX	
0A42 D00E	177	BNE CATLP2	
0A44	178	;	
0A44	179	CATLP:	
0A44 A90B	180	LDA #FILE1	;INIT INDEX TO FILES
0A46 8D0F0C	181	STA INDFX	
0A49 A001	182	LDY #LINK	;WHEN BOTH BYTES OF LINK ARE
0A4B B1FE	183	LDA (BUFPTR),Y	; ZERO YOU ARF THROUGH
0A4D C8	184	INY	
0A4F 11FE	185	ORA (BUFPTR),Y	
0A50 F01D	186	BFQ EXIT	
0A52	187	;	
0A52	188	CATLP2:	
0A52 AC0F0C	189	LDY INDFX	;PRINT A FILF NAME
0A55 20700A	190	JSR PRTFIL	
0A58 AD100C	191	LDA COUNT	
0A5B C90F	192	CMP #15	
0A5D B010	193	BCS EXIT	
0A5F 18	194	CLC	
0A60 AD0F0C	195	LDA INDFX	;INCRFMFNT TO NEXT
0A63 6923	196	ADC #\$23	
0A65 8D0F0C	197	STA INDFX	
0A68 D0F8	198	BNF CATLP2	
0A6A E6FF	199	INC BUFPTR+1	;INCRFMFNT POINTFR FOR NEXT SECTOR
0A6C 4C440A	200	JMP CATLP	;LOOP FOR MORF
0A6F 60	201	EXIT RTS	

0A70	202	PAG	
0A70	203	;	
0A70	204	; THIS PROCEDURE LOOKS AT THE	
0A70	205	; BUFFER AND PULLS OUT THE FILE	
0A70	206	; NAMES PRESENT. THESE FILENAMFS	
0A70	207	; ARE THEN PRINTED TO THE SCREEN.	
0A70	208	;	
0A70	209	;	
0A70	210	PRTFIL:	
0A70 B1FE	211	LDA (BUFPTR),Y	
0A72 F037	212	BFQ SETEOB	;END OF CATALOG
0A74 C9FF	213	CMP #\$FF	
0A76 F032	214	BFQ PRTX	
0A78 A903	215	LDA #3	
0A7A 8524	216	STA CSRHRZ	;TAB 3
0A7C AD100C	217	LDA COUNT	
0A7F FE100C	218	INC COUNT	;COUNT # OF FILES PRINTED
0A82 0A	219	ASL	
0A83 AA	220	TAX	
0A84 18	221	CLC	;POINT TO FILE DESCRIPTOR
0A85 98	222	TYA	
0A86 65FE	223	ADC BUFPTR	
0A88 9D160C	224	STA PTRS,X	
0A8B E8	225	INX	
0A8C A900	226	LDA #0	
0A8E 65FF	227	ADC BUFPTR+1	
0A90 9D160C	228	STA PTRS,X	
0A93 C8	229	INX	
0A94 C8	230	INX	
0A95 C8	231	INX	
0A96 A200	232	LDX 00	
0A98 B1FE	233	PRT1 LDA (BUFPTR),Y	
0A9A F00E	234	BEQ PRTX	
0A9C 20EDFD	235	JSR PUTC	
0A9F C8	236	INX	
0AA0 E8	237	INX	
0AA1 E01E	238	CPX #30	
0AA3 90F3	239	BLT PRT1	
0AA5 A98D	240	LDA 8D	
0AA7 20EDFD	241	JSR PUTC	
0AAA 60	242	PRTX RTS	
0AAB	243	;	
0AAB A9FF	244	SETEOB LDA #\$FF	;FOB = TRUE
0AAD 8D110C	245	STA FOB	
0AB0 60	246	RTS	
0AB1	247	;	
0AB1	248	; PRINT A BUFFER TO SCREEN (Y,A) --> BUFFER	
0AB1	249	;	
0AB1 85FC	250	PBUFF STA PMESS	
0AB3 84FD	251	STY PMESS+1	
0AB5 A000	252	LDY #0	
0AB7 B1FC	253	PBLP LDA (PMESS),Y	
0AB9 F00A	254	BEQ PBEXIT	
0ABB 20EDFD	255	JSR PUTC	
0ABE C8	256	INX	
0ABF D0F6	257	BNE PBLP	
0AC1 E6FD	258	INC PMESS+1	
0AC3 D0F2	259	BNE PBLP	
0AC5 60	260	PBEXIT RTS	

0AC6	261		PAG	
0AC6	262			
0AC6	263		; MACHINE CODE LIGHT PEN DRIVER ROUTINE	
0AC6	264		; ON ENTRY:	
0AC6	265		; RWAIT = 0 FOR NO PEN SWITCH WAIT	
0AC6	266		; =-1 FOR PEN SWITCH WAIT	
0AC6	267			
0AC6	268		; ON EXIT:	
0AC6	269		; XHIGH,XLOW = HI-RES X COORD	
0AC6	270		; YLOW = HI-RES Y COORD	
0AC6	271		; XLORES,YLORES = LORES COORDS	
0AC6	272		; XTEXT,YTEXT = TEXT COORDS	
0AC6	273			
0AC6	A9FF	274	LPEN LDA #\$FF	;INIT MAX X-COORD
0AC8	8D3103	275	STA XHIGH	
0ACB	8D3003	276	STA XLOW	
0ACE	8D3203	277	STA YLOW	
0AD1	8D3803	278	STA LINE	
0AD4	A528	279	LDA BASE	;SAVE OLD TEXT BASE ADDRESS
0AD6	8506	280	STA OLDBAS	
0AD8	A529	281	LDA BASE+1	
0ADA	8507	282	STA OLDBAS+1	
0ADC	EE3803	283	LOOP INC LINE	;INCREMNT PEN COORDINATES AROUND
0ADF	AD3803	284	LDA LINE	; 'TEARDROP' WINDOW UNTIL MINIMUM X IS
0AF2	8DD0C0	285	STA START	;START PEN
0AE5	2CD1C0	286	WAIT BIT DONE	;WAIT FOR PEN TO GO DONF
0AE8	10FB	287	BPL WAIT	
0AEA	2C3903	288	BIT RWAIT	;IF PFN WAIT IS TRUE (-1)
0AED	1005	289	BPL DNT	
0AEF	2CD6C0	290	BIT RING	;THEN WAIT FOR PENSWITCH
0AF2	10F1	291	BPL WAIT	
0AF4	ADD4C0	292	DNT LDA XOVL	;GFT X OVRFLOW VALUE (0 OR 1)
0AF7	2A	293	ROL	
0AF8	A900	294	LDA #0	
0AFA	2A	295	ROL	
0AFB	CD3103	296	CMP XHIGH	;CHECK IF WF HAVE NEW MINIMUM
0AFE	9008	297	BCC NEWC	;SO WE CAN SET UP TO FIND THE
0B00	ADD2C0	298	LDA XCOORD	;NEXT VALUE OR SEE IF
0B03	CD3003	299	CMP XLOW	;WE HAVE ALREADY HAD A SMALLEST X
0B06	B019	300	BCS GREY	
0B08	ADD4C0	301	NEWC LDA XOVL	;SET UP A NEW MINIMUM VALUE
0B0B	2A	302	ROL	
0B0C	A900	303	LDA #0	
0B0E	2A	304	ROL	
0B0F	8D3103	305	STA XHIGH	
0B12	ADD2C0	306	LDA XCOORD	
0B15	8D3003	307	STA XLOW	
0B18	ADD3C0	308	LDA YCOORD	
0B1B	8D3203	309	STA YLOW	
0B1E	38	310	SEC	;AND GET ANOTHER VALUE FROM PEN
0B1F	B0BB	311	BCS LOOP	



0B21		312	PAG	
0B21	AD3203	313	GREST LDA YLOW	;CALCULATE REST OF COORDS
0B24	4A	314	LSR	;XLORES = (XHIGH,XLOW)/7
0B25	4A	315	LSR	;YLORES = YLOW/4
0B26	8D3403	316	STA YLORFS	;XTFXT = (XHIGH,XLOW)/7 + 1
0B29	4A	317	LSR	;YTEXT = YLOW/8 + 1
0B2A	8D3603	318	STA YTEXT	
0B2D	A907	319	LDA #7	
0B2F	8D3F03	320	STA YH	
0B32	AD3103	321	LDA XHIGH	
0B35	8D3D03	322	STA XH	
0B38	AD3003	323	LDA XLOW	
0B3B	8D3C03	324	STA XL	
0B3E	A900	325	DIVIDE LDA #0	;DIVIDE XH,XL/YH -> QUOTH
0B40	8D3A03	326	STA QUOTL	
0B43	8D3B03	327	STA QUOTH	
0B46	8D3F03	328	STA YL	
0B49	A010	329	LDY #16	;SIXTEEN BITS
0B4B	0F3A03	330	DIV2 ASL QUOTL	
0B4E	2E3B03	331	ROL QUOTH	
0B51	2F3C03	332	ROL XL	
0B54	2E3D03	333	ROL XH	
0B57	38	334	SEC	
0B58	AD3C03	335	LDA XL	
0B5B	ED3E03	336	SBC YL	
0B5E	AA	337	TAX	
0B5F	AD3D03	338	LDA XH	
0B62	ED3F03	339	SBC YH	
0B65	9009	340	BCC DIV3	
0B67	8E3C03	341	STX XL	
0B6A	8D3D03	342	STA XH	
0B6D	EE3A03	343	INC QUOTL	
0B70	88	344	DIV3 DFY	
0B71	D0D8	345	BNF DIV2	
0B73	AD3B03	346	LDA QUOTH	;STORE QUOTIENT IN X-COORD
0B76	8D3503	347	STA XTEXT	
0B79	8D3303	348	STA XLORES	
0B7C	AD3603	349	LDA YTEXT	
0B7F	20C1FB	350	JSR BASCAL	;GET THE CHARACTER OFF SCREEN
0B82	AC3503	351	LDY XTFXT	
0B85	B128	352	LDA (BASE),Y	
0B87	8D3703	353	STA CHAR	
0B8A	FF3503	354	INC XTFXT	;TEXT COORD'S ARE RFLATIVE
0B8D	FE3603	355	INC YTEXT	;TO ONE NOT ZFRO SO INCREMENT
0B90	A506	356	LDA OLDBAS	;RFSTORF OLD TEXT BASE ADDRESS
0B92	8528	357	STA BASE	
0B94	A507	358	LDA OLDBAS+1	
0B96	8529	359	STA BASE+1	
0B98	60	360	RTS	

0B99	361	PAG	
0B99	362	;	
0B99	363	; *** EQUATFS	
0B99	364	;	
0B99	365	HOME	FQU \$FC58
0B99	366	DONE	FQU \$C0D1 ;PEN DONE FLAG
0B99	367	START	FQU \$C0D0 ;START AT LINE Q
0B99	368	XOVFL	FQU \$C0D4 ;X > 255 FLAG
0B99	369	XCOORD	FQU \$C0D2 ;LOW X-COORD
0B99	370	YCOORD	FQU \$C0D3 ;Y-COORD
0B99	371	RING	FQU \$C0D6 ;TOUCH SWITCH FLAG
0B99	372	BASCAL	FQU \$FBC1 ;CALCULATE TEXT BASE ADDRESS AT BASE
0B99	373	BASE	EPZ \$28 ;TEXT LINE BASE ADDRESS
0B99	374	OLDBAS	EPZ \$06
0B99	375	XLOW	FQU \$330 ;X RFTURN COORDINATE
0B99	376	XHIGH	FQU \$331 ;HIGH PART OF X
0B99	377	YLOW	FQU \$332 ;HIRES Y-COORD
0B99	378	XLORES	FQU \$333 ;LORES X-COORD
0B99	379	YLORES	FQU \$334 ;LORES Y-COORD
0B99	380	XTEXT	FQU \$335 ;X TEXT COORD
0B99	381	YTEXT	FQU \$336 ;Y TEXT COORD
0B99	382	CHAR	FQU \$337 ;CHARACTER AT TTEXT COORD. X,Y
0B99	383	LINE	FQU \$338 ;SCAN LINE OF 'TFARDROP' WINDOW OF MI
0B99	384	RWAIT	FQU \$339 ;PARAMETER TO WAIT FOR PEN SWITCH
0B99	385	QUOTL	FQU \$33A
0B99	386	QUOTH	FQU \$33B
0B99	387	XL	FQU \$33C
0B99	388	XH	FQU \$33D
0B99	389	YL	FQU \$33F
0B99	390	YH	FQU \$33F
0B99 8D8D	391	MFSS	HFX 8D8D
0B9B D0CFC9	392	ASC	"POINT TO FILE AND TOUCH RING TO RUN"
0B9E CFD4A0			
0BA1 D4CFA0			
0BA4 C6C9CC			
0BA7 C5A0C1			
0BAA CFC4A0			
0BAD D4CFD5			
0BB0 C3C8A0			
0BB3 D2C9CF			
0BB6 C7A0D4			
0BB9 CFA0D2			
0BBC D5CE			
0BBE 8D8D	393	HEX	8D8D
0BC0 A0A0A0	394	ASC	" "
0BC3 100F09	395	INV	"POINT BELOW FILES TO CONTINUE"
0BC6 0E1420			
0BC9 02050C			
0BCC 0F1720			
0BCF 06090C			
0BD2 051320			
0BD5 140F20			
0BD8 030F0E			
0BDB 14090E			
0BDE 1505			
0BF0 00	396	HFX	00

0BE1	397	PAG	
0BE1 8D8D84	398	BRUN	HFX 8D8D84
0BF4 C2D2D5	399		ASC "BRUN "
0BE7 CEA0			
0BE9 00	400		HFX 00
0BEA 8D8D84	401	RUN	HEX 8D8D84
0BED D2D5CF	402		ASC "RUN "
0BF0 A0			
0BF1 00	403		HFX 00
0BF2 A0A0A0	404	ERR	ASC " "
0BF5 A0A0A0			
0BF8 A0			
0BF9 43414E	405		BLK "CAN'T RUN A TEXT FILE"
0BFC 675460			
0BFF 52554E			
0C02 604160			
0C05 544558			
0C08 546046			
0C0B 494C45			
0C0E 00	406		HEX 00
0C0F 00	407	INDEX	HEX 00
0C10 00	408	COUNT	HEX 00
0C11 00	409	FOB	HEX 00
0C12 01	410	OLDX	HFX 01
0C13 01	411	OLDY	HFX 01
0C14 A0	412	TEMP	HFX A0
0C15 00	413	TEMP1	HEX 00
0C16	414	LINK	EQU \$1
0C16	415	FILE1	EPZ \$B
0C16	416	CSRHRZ	EPZ \$24
0C16	417	POINT	EPZ \$FA
0C16	418	PMFSS	EPZ \$FC
0C16	419	GFTIOB	FQU \$03E3
0C16	420	SETTXT	FQU \$FB39
0C16	421	VTAB	FQU \$FC24
0C16	422	FRFOL	FQU \$FC9C
0C16	423	PUTC	FQU \$FDED
0C16	424	WAIT1	FQU \$FCA8
0C16	425	BUFPTR	FPZ \$FE
0C34	426	PTRS	DFS 30
0C34	427	; INPUT/OUTPUT CONTROL BLOCK AS DESCRIBED IN THE APPLE DOS 3.2 M/	
0C34	428	; PAGES 91-98, AND 123-138.	
0C34 01	429	IOB	HFX 01
0C35 60	430	SLOT	HFX 60
0C36 01	431	DRIVE	HFX 01
0C37 00	432	VOL	HEX 00
0C38 11	433	TRACK	HEX 11
0C39 00	434	SECTOR	HEX 00
0C3A 450C	435	DCT	ADR DEVICE
0C3C 490C	436	BUF	ADR BUFFER
0C3F 0000	437	UNUSED	HEX 0000
0C40 00	438	CMD	HEX 00
0C41 00	439	ERROR	HEX 00
0C42 00	440	ACTVOL	HEX 00
0C43 60	441	PRVSLT	HEX 60
0C44 01	442	PRVDRV	HFX 01
0C45 0001FF	443	DEVICE	HEX 0001EFD8
0C48 D8			
0C49	444	BUFFER	FQU *
0C49	445	LENGTH	FQU *-CONTRL

;END OF BUFFFR FLAG  
 ;OLD TEXT COORDINATES  
 ;TEMP STORAGE  
 ;LINK DISPLACEMENT  
 ;FIRST FILE DISPLACEMENT  
 ;FILE POINTER TO RUN  
 ;CHARACTER OUTPUT ROUTINE  
 ;BUFFFR POINTER  
 ;FILE POINTERS  
 ;SLOT 6  
 ;DRIVE 1  
 ;ANY VOLUME  
 ;TRACK TO BE READ/WRITTEN  
 ;SECTOR TO BE READ/WRITTEN  
 ;POINTER TO DEVICE CHAR. TABLE  
 ;POINTER TO BUFFFR AREA.  
 ;COMMAND CODE GOES HERE.  
 ;ERROR CODE RETURNED HERE.  
 ;ACTUAL VOLUME FOUND  
 ;PREVIOUS SLOT  
 ;PREVIOUS DRIVE  
 ;DEVICE CHARACTERISTICS TABLE

0C49

446  
447

PAG  
FND

\*\*\*\*\* END OF ASSFMBLY

\*\*\*\*\*  
\*  
\* SYMBOL TABLE -- V 1.5 \*  
\*  
\*\*\*\*\*

LABEL. LOC. LABEL. LOC. LABEL. LOC.

\*\* ZERO PAGE VARIABLES:

BASE 0028 OLDBAS 0006 FILE1 000B CSRHRZ 0024 POINT 00FA PMESS 00FC  
BUFPTR 00FE

\*\* ABSOLUTE VARIABLES/LABELS

CONTRL	0900	CTRLP	0919	CTR1	0934	CHANGE	094A	CTR2	0972		
BASIC	09AC	PFILE	09B3	PFLP	09B7	CTR3	09C6	CTREX	09D3	FILFRR	09D4
CAT	09F3	CLOOP	0A07	GETCUR	0A17	CAT1	0A32	CATLP	0A44	CATLP2	0A52
EXIT	0A6F	PRTFIL	0A70	PRT1	0A98	PRTX	0AAA	SETEOB	0AAB	PBUFF	0AB1
PBLP	0AB7	PBEXIT	0AC5	LPEN	0AC6	LOOP	0ADC	WAIT	0AE5	DNT	0AF4
NEWC	0B08	GREST	0B21	DIVIDE	0B3F	DIV2	0B4B	DIV3	0B70	HOMF	FC58
DONE	C0D1	START	C0D0	XOVFL	C0D4	XCOORD	C0D2	YCOORD	C0D3	RING	C0D6
BASCAL	FBC1	XLOW	0330	XHIGH	0331	YLOW	0332	XLORES	0333	YLORES	0334
XTEXT	0335	YTEXT	0336	CHAR	0337	LINE	0338	RWAIT	0339	QUOTL	033A
QUOTH	033B	XL	033C	XH	033D	YL	033F	YH	033F	MFSS	0B99
BRUN	0BF1	RUN	0BFA	FRR	0BF2	INDFX	0C0F	COUNT	0C10	FOB	0C11
OLDX	0C12	OLDY	0C13	TEMP	0C14	TFMP1	0C15	LINK	0001	GFTIOB	03F3
SETTXT	FB39	VTAB	FC24	ERFOL	FC9C	PUTC	FD0D	WAIT1	FCA8	PTRS	0C16
IOB	0C34	SLOT	0C35	DRIVE	0C36	VOL	0C37	TRACK	0C38	SECTOR	0C39
DCT	0C3A	BUF	0C3C	UNUSED	0C3F	CMD	0C40	FRROR	0C41	ACTVOL	0C42
PRVSLT	0C43	PRVDRV	0C44	DEVICE	0C45	BUFFER	0C49	LFNGTH	0349		

SYMBOL TABLE STARTING ADDRESS:5800  
SYMBOL TABLE LENGTH:033A

!PR#0  
PR#0

```

30000 REM MAKE THIS STATEMENT
30010 REM PART OF A DIM STATEMENT
30020 REM AT THE BEGINNING OF
30030 REM YOUR PROGRAM
30040 DIM ZX(2),ZY(2)
30050 REM INITIALIZE MINIMUM
30060 REM VALUES FOR X COORD.
30070 Z1=512:ZQ=0
30080 REM NOW RUN THROUGH LIGHT
30090 REM PEN'S TEARDROP WINDOW
30100 REM AND LOOK FOR A MINIMUM
30110 REM X VALUE
30120 REM FIRST START THE PEN
30130 POKE -16176,ZQ
30140 REM NOW WAIT FOR THE PEN
30150 REM TO GET POINT AND GO
30160 REM DONE SO WE CAN GET
30170 REM THE COORDINATES
30180 IF PEEK (-16175)<128 THEN 30180
30190 REM NOW PULL COORDINATES
30200 REM OFF THE PEN CARD
30210 ZX(0)= PEEK (-16174)+256*( PEEK (-16172)>127): REM HI-RES X COORDINATE
30220 ZY(0)= PEEK (-16173): REM HI-RES Y COORDINATE
30230 IF ZX(0)>Z1 THEN 30330
30240 REM X WAS LOWER THAN THE
30250 REM PREVIOUS MINIMUM SO
30260 REM CHECK IF NEXT ONE IS
30270 REM LESS THAN THIS ONE
30280 Z1=ZX(0):Z2=ZY(0):ZQ=ZQ+1: GOTO 30130
30290 REM THIS IS TO WAIT FOR
30300 REM RING TO BE PRESSED
30310 REM SO THE USER CAN
30320 REM INDICATE HIS RESPONSE
30330 IF PEEK (-16170)<128 THEN 30330
30340 REM MINIMUM X VALUE WAS
30350 REM FOUND SO CALCULATE
30360 REM THE VALUES FOR THE
30370 REM LO-RES AND TEXT SCREENS
30380 ZX(0)=Z1:ZX(1)=Z1/7:ZX(2)=ZX(1)+1
30390 ZY(0)=Z2:ZY(1)=Z2/4:ZY(2)=Z2/8+1
30400 REM CALCULATE MEMORY LOC.
30410 REM FOR TEXT SCREEN
30420 ZU=1024+128*(ZY(1) MOD 8)+40*(ZY(0)/64)+ZX(1)
30430 REM GET CHAR FROM SCREEN
30440 POS=14:CMD= PEEK (ZU): GOSUB 30450: GOTO 30460
30450 LC1= PEEK (224):LC2= PEEK (225)-(LC1>244): POKF 81+POS+LC1-256*(LC2>
127)+(LC2-255*(LC2>127))*256,CMD: RETURN
30460 ZN= PEEK (ZU):Z$="L"
30470 RETURN
30480 REM
30490 REM *****
30500 REM * *
30510 REM * COPYRIGHT 1979 *
30520 REM * *
30530 REM * SYMTEC, INC. *
30540 REM * *
30550 REM *****

```

```

60000 REM MAKE THIS STATEMENT
60010 RFM PART OF A DIM STATEMENT
60020 REM AT THE BEGINNING OF
60030 RFM YOUR PROGRAM
60040 DIM ZX(2),ZY(2)
60050 RFM INITIALIZE MINIMUM
60060 RFM VALUES FOR X COORD.
60070 Z1 = 512:ZQ = 0
60080 REM NOW RUN THROUGH LIGHT
60090 REM PEN'S TEARDROP WINDOW
60100 RFM AND LOOK FOR A MINIMUM
60110 RFM X VALUE
60120 RFM FIRST START THF PEN
60130 POKE - 16176,ZQ
60140 REM NOW WAIT FOR THF PEN
60150 REM TO GET POINT AND GO
60160 REM DONE SO WE CAN GET
60170 RFM THF COORDINATES
60180 IF PEEK ( - 16175) < 128 THEN 60180
60190 REM NOW PULL COORDINATES
60200 REM OFF THE PEN CARD
60210 ZX(0) = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127): REM HI-R
    ES X COORDINATE
60220 ZY(0) = PEEK ( - 16173): RFM HI-RES Y COORDINATE
60230 IF ZX(0) > Z1 THEN 60330
60240 REM X WAS LOWER THAN THE
60250 RFM PREVIOUS MINIMUM SO
60260 RFM CHECK IF NFXT ONF IS
60270 REM LFSS THAN THIS ONF
60280 Z1 = ZX(0):Z2 = ZY(0):ZQ = ZQ + 1: GOTO 60130
60290 REM THIS IS TO WAIT FOR
60300 RFM RING TO BF PRFSSED
60310 RFM SO THF USFR CAN
60320 RFM INDICATE HIS RFSPONSF
60330 IF PEEK ( - 16170) < 128 THEN 60330
60340 REM MINIMUM X VALUE WAS
60350 RFM FOUND SO CALCULATF
60360 REM THF VALUES FOR THF
60370 REM LO-RES AND TEXT SCRFENS
60380 ZX(0) = Z1:ZX(1) = INT (Z1 / 7):ZX(2) = ZX(1) + 1
60390 ZY(0) = Z2:ZY(1) = INT (Z2 / 4):ZY(2) = INT (Z2 / 8) + 1
60400 REM CALCULATE MEMORY LOC.
60410 REM FOR TEXT SCREEN
60420 ZU = 1024 + 128 * INT ((ZY(1) / 8 - INT (ZY(1) / 8)) * 8) + 40 *
    INT (ZY(0) / 64) + ZX(1)
60430 REM GET CHAR FROM SCRFEN
60440 ZN = PEEK (ZU):Z$ = CHR$ (ZN)
60450 RETURN
60460 REM
60470 REM *****
60480 REM * COPYRIGHT 1979 *
60490 REM * *
60500 REM * SYMTEC, INC. *
60510 REM * *
60520 REM *****

```

```

35 DIM BO(5,5),SC(2),A$(2),CO(2),WX(6),WY(6),WN(6)
40 TEXT : HOME : VTAB 12
45 HTAB 16: PRINT "LIGHT PEN": PRINT
50 HTAB 14: PRINT "CONCENTRATION"
70 FOR T = 1 TO 2000: NEXT :CO(1) = 0:CO(2) = 0
80 GOTO 260
100 REM BOARD
105 RESTORE
110 FOR Q = 0 TO 4: FOR K = 0 TO 4: READ BO(Q,K): NEXT K,Q
170 FOR Q = 0 TO 4: FOR K = 0 TO 4
190 X3 = INT ( RND (1) * 5):X4 = INT ( RND (1) * 5)
200 Z = BO(X3,X4):BO(X3,X4) = BO(Q,K):BO(Q,K) = Z
230 NEXT K,Q:TURN = 0: GOTO 2000
260 HOME : VTAB 10
270 PRINT "HOW MANY PLAYERS ";: INPUT HG: PRINT : IF HG = 0 THEN 500
290 PRINT "WHAT IS PLAYER #1'S NAME ";: INPUT A$(1): IF HG = 1 THEN 600
310 PRINT "WHAT IS PLAYER #2'S NAME ";: INPUT A$(2): GOTO 1000
500 A$(1) = "APPLE I":CO(1) = 1
600 A$(2) = "APPLE II":CO(2) = 1
700 GOTO 1000
800 REM LIGHT PEN SUBROUTINE
810 Z1 = 512:ZQ = 0
820 POKE - 16176,ZQ
830 IF PEEK ( - 16175) < 128 THEN 830
840 ZX = PEEK ( - 16174) + 256 * ( PEEK ( - 16172) > 127)
850 ZY = PEEK ( - 16173)
860 IF ZX > Z1 THEN 890
870 Z1 = ZX:Z2 = ZY:ZQ = ZQ + 1: GOTO 820
890 ZX = Z1:ZY = Z2: RETURN
1000 TEXT : CALL - 936: GR : COLOR= 2
1005 FOR P = 0 TO 32 STEP 8: FOR L = 0 TO 6: FOR M = 1 TO 5
1040 HLIN (M - 1) * 8,(M - 1) * 8 + 6 AT P + L
1050 NEXT M,L,P:SC(1) = 0:SC(2) = 0: GOTO 100
2000 REM MAIN PROGRAM
2010 TURN = TURN + 1
2020 VTAB (22): PRINT " TURN #";TURN
2030 FOR TR = 1 TO 2
2040 PRINT A$(TR);"'S TURN"
2045 IF CO(TR) = 1 GOTO 2121
2050 GOSUB 800: IF PEEK ( - 16170) < 128 THEN 2050
2070 X = INT (ZX / 7):Y = INT (ZY / 4)
2075 IF X > 39 OR X < 0 OR Y > 39 OR Y < 0 GOTO 2050
2080 IF SCRN( X,Y) = 0 GOTO 2050
2090 X = INT (X / 8):Y = INT (Y / 8)
2100 IF BO(X,Y) > 0 GOTO 2125
2110 PRINT "ALREADY PICKED. TRY AGAIN."
2115 FOR H = 1 TO 100: NEXT H
2120 GOTO 2050
2121 GOSUB 25000
2125 MN = BO(X,Y)
2126 GOSUB 27000
2127 PRINT " ";
2130 ON MN GOSUB 11000,12000,13000,14000,15000,16000,17000,11500,12500,1
3500,14500,15500,16500
2140 FOR V = 1 TO 100: NEXT V
2150 A = X:B = Y
2155 IF CO(TR) = 1 GOTO 2261
2160 GOSUB 800: IF PEEK ( - 16170) < 128 THEN 2160
2180 X = INT (ZX / 7):Y = INT (ZY / 4)
2185 IF X > 39 OR X < 0 OR Y > 39 OR Y < 0 GOTO 2160
2190 IF SCRN( X,Y) = 0 GOTO 2160
2200 X = INT (X / 8):Y = INT (Y / 8)

```

```

2210 IF BO(X,Y) > 0 GOTO 2240
2220 PRINT "ALREADY PICKED. TRY AGAIN."
2230 GOTO 2160
2240 IF X < > A OR Y < > B GOTO 2265
2250 PRINT "YOU JUST PICKED THAT. TRY AGAIN."
2260 GOTO 2160
2261 GOSUB 26000
2265 MN = BO(X,Y)
2267 GOSUB 27000
2268 PRINT "";
2270 ON MN GOSUB 11000,12000,13000,14000,15000,16000,17000,11500,12500,1
3500,14500,15500,16500
2280 IF BO(X,Y) = BO(A,B) OR BO(A,B) = 7 OR BO(X,Y) = 7 GOTO 3000
2290 PRINT : PRINT "SORRY, NO MATCH."
2300 FOR KP = 1 TO 500: NEXT
2320 COLOR= 2
2330 FOR M = 0 TO 6: HLIN X * 8, X * 8 + 6 AT Y * 8 + M: HLIN A * 8, A * 8
+ 6 AT B * 8 + M: NEXT M
2390 GOTO 4000
3000 PRINT : PRINT "A MATCH !!!"
3005 IF BO(A,B) = 7 THEN WI = BO(X,Y)
3007 IF BO(X,Y) = 7 THEN WI = BO(A,B)
3010 SC(TR) = SC(TR) + 1
3020 BO(A,B) = 0:BO(X,Y) = 0
3030 HN = 0
3040 FOR V = 1 TO 5: FOR I = 1 TO 5: IF BO(V,I) > 0 THEN HN = HN + 1
3050 NEXT I,V
3090 IF HN < 2 THEN 30000
3095 GOTO 2040
4000 HOME : NEXT TR
4030 PRINT " THE SCORES ARE : "
4040 PRINT A$(1);": ";SC(1)
4050 PRINT A$(2);": ";SC(2)
4060 FOR N = 1 TO 1000: NEXT : HOME : GOTO 2000
11000 COLOR= 12: GOSUB 20000
11010 COLOR= 14
11020 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 1
11030 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 5
11040 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 1
11050 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 5
11060 RETURN
11500 COLOR= 4: GOSUB 20000
11510 COLOR= 10: GOTO 14020
12000 COLOR= 11: GOSUB 20000
12010 COLOR= 7: GOTO 11020
12500 COLOR= 13: GOSUB 20000
12510 COLOR= 14: GOTO 16020
13000 COLOR= 8: GOSUB 20000
13010 COLOR= 5: GOTO 11020
13500 COLOR= 8: GOSUB 20000
13510 COLOR= 6: GOTO 16020
14000 COLOR= 13: GOSUB 20000
14010 COLOR= 3
14020 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + 3
14030 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + 3
14040 RETURN
14500 COLOR= 3: GOSUB 20000
14510 COLOR= 11
14520 FOR M = 1 TO 5 STEP 2
14530 HLIN X * 8 + 1,X * 8 + 5 AT Y * 8 + M
14540 VLIN Y * 8 + 1,Y * 8 + 5 AT X * 8 + M
14550 NEXT M
14560 RETURN
15000 COLOR= 14: GOSUB 20000
15010 COLOR= 9: GOTO 14020
15500 COLOR= 7: GOSUB 20000

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15510 COLOR= 4: GOTO 14520
16000 COLOR= 1: GOSUB 2000
16010 COLOR= 15
16020 FOR S = 1 TO 5
16030 PLOT X * 8 + S, Y * 8 + S
16040 PLOT X * 8 + (S * - 1) + 6, Y * 8 + S
16050 NEXT S
16060 RETURN
16500 COLOR= 1: GOSUB 20000
16510 COLOR= 6: GOTO 14520
17000 COLOR= 5: GOSUB 20000
17010 COLOR= 9
17020 FOR R = 1 TO 5 STEP 2
17030 VLIN Y * 8 + 1, Y * 8 + 5 AT X * 8 + R
17040 NEXT R
17050 PLOT X * 8 + 2, Y * 8 + 5: PLOT X * 8 + 4, Y * 8 + 5
17060 VTAB (24): PRINT " THE WILD CARD !!!
17070 RETURN
20000 FOR D = 0 TO 6
20010 HLIN X * 8, X * 8 + 6 AT Y * 8 + D
20020 NEXT D
20030 RETURN
25000 FOR K = 1 TO 5: FOR B = K + 1 TO 6
25020 IF WN(K) = WN(B) THEN 25100
25030 NEXT B, K
25050 X = INT ( RND (1) * 5): Y = INT ( RND (1) * 5)
25060 IF BO(X, Y) = 0 GOTO 25070
25061 IF BO(X, Y) = WI GOTO 25070
25062 IF TURN > 1 AND HN < 5 GOTO 25068
25063 FOR LT = 1 TO 6
25064 IF X = WX(LT) AND Y = WY(LT) GOTO 25050
25066 NEXT LT
25068 RETURN
25070 X = X + 1: IF X > 4 THEN Y = Y + 1
25080 IF X > 4 THEN X = 0: IF Y > 4 THEN Y = 0
25090 GOTO 25060
25100 IF BO(WX(K), WY(K)) = 0 GOTO 25030
25101 IF K = B GOTO 25030
25105 IF WX(1) = WX(3) AND WY(1) = WY(3) GOTO 25030
25110 IF BO(WX(B), WY(B)) = 0 GOTO 25030
25120 X = WX(B): Y = WY(B): RETURN
26000 FOR FV = 1 TO 6
26010 IF WN(FV) = BO(A, B) GOTO 26040
26020 NEXT FV
26030 GOSUB 25050
26032 IF X = A AND Y = B GOTO 26030
26035 RETURN
26040 IF BO(WX(FV), WY(FV)) = 0 GOTO 26020
26045 IF A = WX(FV) AND B = WY(FV) GOTO 26020
26050 X = WX(FV): Y = WY(FV): RETURN
27000 FOR PL = 5 TO 1 STEP - 1
27010 WX(PL + 1) = WX(PL)
27020 WY(PL + 1) = WY(PL)
27030 WN(PL + 1) = WN(PL)
27040 NEXT PL
27050 WX(1) = X: WY(1) = Y: WN(1) = BO(X, Y)
27060 RETURN
30000 TEXT : HOME : VTAB 9: PRINT " FINAL SCORES"
30020 PRINT : PRINT AS(1); " : "; SC(1); " : "; AS(2); " : "; SC(2)
30030 PRINT : SZ = 1: IF SC(2) > SC(1) THEN SZ = 2
30060 IF SC(2) = SC(1) THEN PRINT " A TIE !!!!!": GOTO 30100
30070 PRINT AS(SZ); " WINS !!!!!"
30100 IF CO(1) = 0 OR CO(2) = 0 THEN 30109
30105 FOR Q = 1 TO 1000: NEXT : GOTO 1000
30109 PRINT : INPUT "DO YOU WANT TO PLAY AGAIN? "; X$
30118 IF LEFT$(X$, 1) = "Y" THEN 1000

```

```
30120 VTAB 20: PRINT " BYE !": VTAB 22
30150 DATA 1,2,3,4,9,8,7,6,5,10,11,12,13,1,2,3,4,5,6,8,9,10,11,12,13
60000 END
```

#### NOTICE

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Systems Technology for the Future

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SYMTEC LIGHT PEN WARRANTY REGISTRATION CARD

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Purchased From \_\_\_\_\_  
(Name of Store)

\_\_\_\_\_  
(Address)

Name \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Telephone Number \_\_\_\_\_ Purchase Date \_\_\_\_\_